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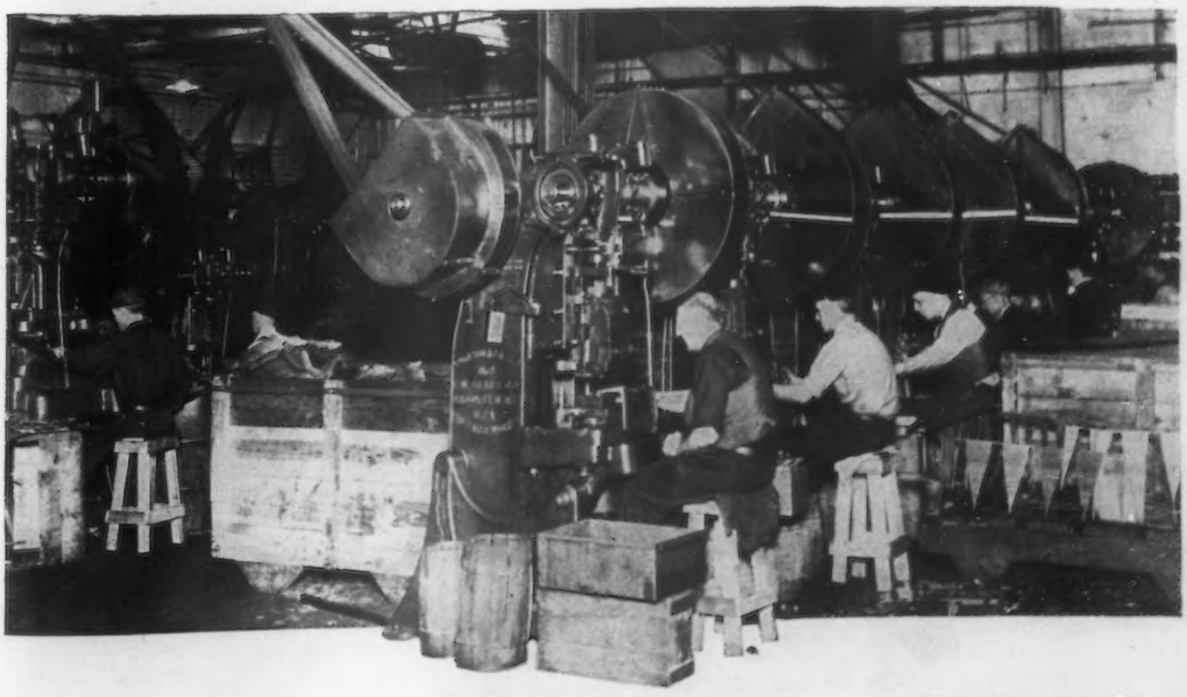
7500 All-Steel Toys a Day

Production Saves Auto-Body Scrap and Occupies Parts Manufacturer During Slack Season for Automobiles

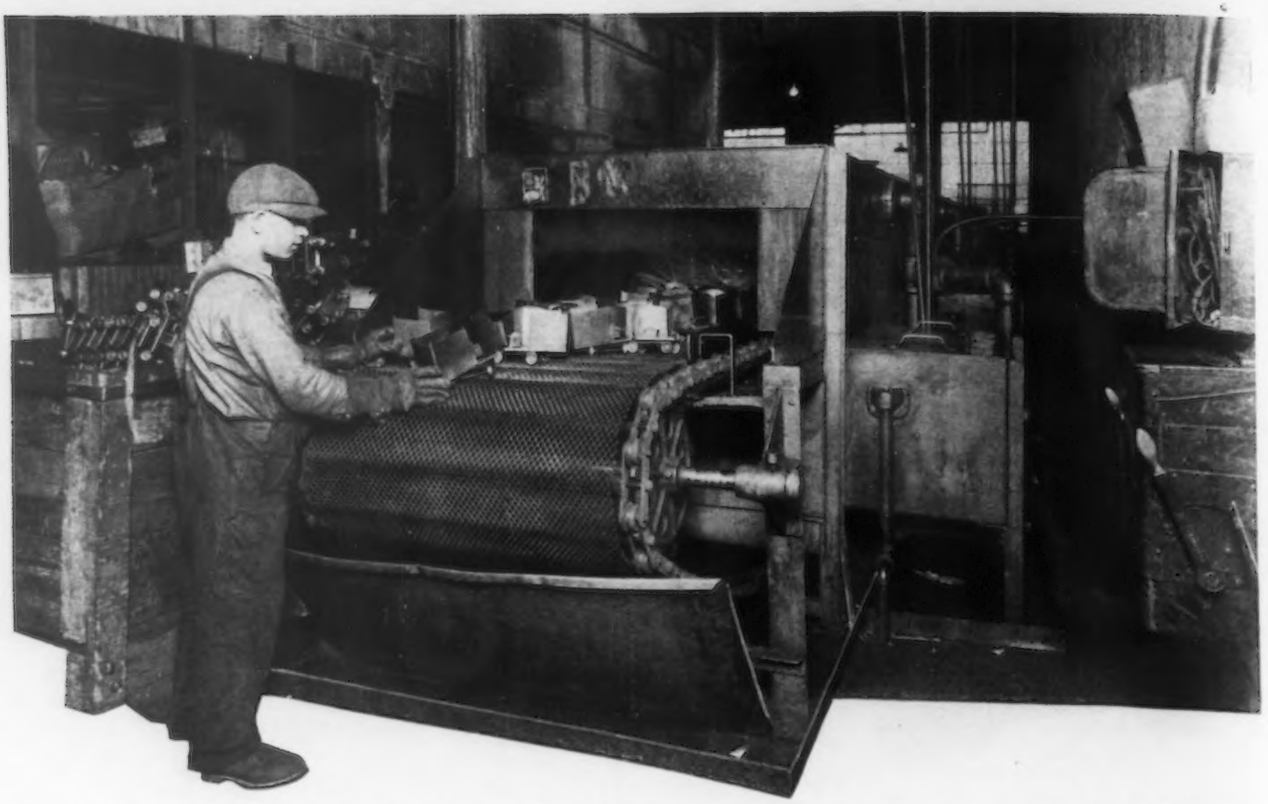
AUTOMOBILES for grown-ups and for kindergartners form a combination that has solved two problems in the plant of Murray Ohio Mfg. Co., Cleveland. One was to find some way to keep the plant busy during seasonal lulls in demand for automobile stampings. The other was to find some use for the large quantity of high-grade sheet scrap that was being bundled and sold at a low price.

Pressed steel juvenile vehicles, manufactured as a side line, seemed to be a solution of these two problems. At the start, five years ago, only scrap metal was used for these products, but the company's business in this side line has grown to such an extent that considerable auto body seconds now has to be purchased for toy manufacture. At present salvaged scrap represents about 30 per cent of the amount of sheet steel consumed in the toy plant.

From the standpoint of seasonal demand the two lines fit together admirably. A rising demand for automobile stampings usually starts in January but tapers off in June. During the following month toy manufacturing begins its seasonal activity, reaches its prime during August



First Steps in Making Steel Toys. Bigger stampings are made on presses at other times used for automobile doors or panels; this battery of small machines is used exclusively for minor toy parts



Spray Machine for Cleaning. Parts to have same color are sub-assembled, then cleaned, enameled and baked on continuous machinery adopted from best auto-body practice

and ends with November. Nearly all toys must leave the factory not later than Dec. 1 to reach retail stores for holiday trade.

In the past few years the public has been buying better and more lasting toys, toys that will stand up under hard usage. This tendency has favored American makers, who have to face the competition of inferior imported toys. American pressed steel toys also occupy a distinct field, as the German toy makers, who in the past have been the strongest competitors, center their efforts largely on what are known as mechanical toys.

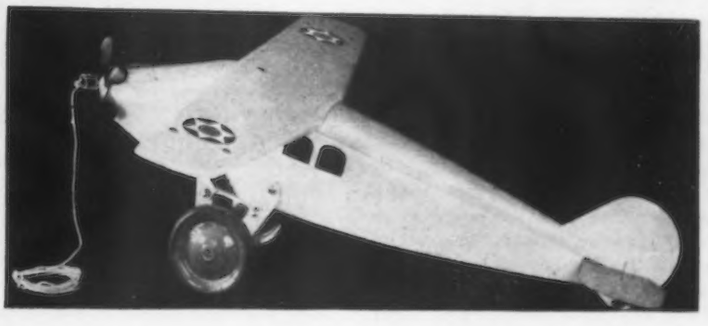
Another favorable factor is the American mass production of pressed steel toys, as exemplified in the Murray Ohio plant, which results in a marked decrease in the cost of making a high-grade article. Thus the manufacturers have kept pace with the demands of the youngsters for toys that are equipped with most of the extras they see on grown-ups' vehicles. Some of the higher grade juvenile automobiles and trucks have such refinements as ball bearings on the rear axles, roller bearing front wheels and carbon steel springs, as well as the numerous accessories found on modern types of passenger cars.

Santa Claus's Assistants. Youngsters, rather than gray beards, having a good time building motorized "hook-and-ladders"

Starting to make juvenile vehicles five years ago as a side line, the Murray Ohio Co. has increased production of "Steelcraft" toys to an output of 850,000 pieces a year. These range from a sturdy all-steel coaster wagon or a juvenile automobile down to a tiny red cart a baby finds delight in pulling around the living room floor, and include all-steel juvenile trucks, airplanes, scooters, wheelbarrows and steam shovels. The company's maximum daily output is 7500 toys and shipments reach 6 to 7 carloads per day.

The scrap used in the toy department is largely 20 to 22-gage auto-body stock, although material as thick as 12 gage finds its way into front axles. Thus the $5 toy automobile is made in considerable part of as good quality steel as a high-priced passenger car.

Scrap from automobile stampings goes from the blanking presses to a shear, where the pieces of sufficient size to salvage are cut off and the remainder goes to the baling press. Some of the scrap is left in a form difficult to handle and has comparatively small sections that can be used, so that it is not worth the time required to salvage it. However, from 50 to 75 per cent of the sheet material that was formerly scrapped is salvaged for the manufacture of toys.



The heavier stampings, such as frames, hoods and body parts for juvenile vehicles and tops for coaster wagons, are formed on the same large presses that are used in making automobile stampings, thus keeping the equipment busy when automobile manufacturing is slack. This is supplemented by a number of small presses for blanking and forming minor parts.

Stamped parts for toys all go from the presses to a stockroom or clearing house, and from there they are delivered to the sub-assembly department. Usually there are two or more colors on a toy vehicle, and the parts are sub-assembled according to the finish they are to have, in order that each portion may be enameled as a unit. Both spot welding and riveting are used in joining the individual parts, welding being preferred. Power riveting machines of the tubular type are used.

The sub-assembly units are washed in a machine where they are first sprayed with a caustic solution, then cleaned and dried. Work is carried through this machine on a woven wire belt. After cleaning they go to the enameling department, where the parts are dip painted in enamel and hung on racks that carry them through a continuous baking oven. This is a double chamber oven having one chamber for black work and the other for red, green and blue. The black enamel is baked for two hours at a temperature of 450 deg. Fahr. Other colors pass through at a lower temperature and at a somewhat slower rate. The oven is equipped with automatic temperature control, and was built by Young Brothers Co.

Sometimes there is further finishing in colors, or striping is put on by hand. The sub-assemblies go to the final assembly room after painting, and when completed the toys are boxed and moved to the shipping department.

Some special equipment has been installed. The most interesting is a special welding machine for affixing tires. These tires, of solid rubber cut to length, have a wire running through the center and extending slightly beyond the ends. In one operation the tire is pulled tightly around a disk wheel and the protruding wire ends are welded in their lapped position. While this is being done the ends of the rubber are held back an inch or two from the joint. When the weld is completed and the wheel leaves the machine the two ends of the rubber tire spring together.

Toy airplanes are made in a separate department equipped with spot welding and riveting machines, a power hammer for driving on the wheels, and a special baking oven for drying the 20 parts after they are dip painted a light gray enamel. This enameling is done before assembling.

Fatigue Strength of Steam Turbine Blades

A STUDY of turbine blading has been made by Moore, Lyon and Alleman, University of Illinois Engineering Experiment Station, for Allis-Chalmers Mfg. Co. (Bulletin 183.) Short lengths of the blades were mounted in special chucks and rotated under load until failure developed from the alternating bending stresses. Failure started at the tips, usually at the thicker one, where the highest stress in bending occurred. Owing to the unsymmetrical shape of the cross sectional area, there were certain harmonic inertia effects to be evaluated; furthermore, the ordinary beam formulas required modification. After such corrections had been applied, the endurance limits of the drawn blades were found to be nearly as high as that of larger bars, machined to the standard round specimen. This conclusion is verified by experience with steam turbines.

Blades tested were of cupro-nickel (80:20), monel metal, and cyclops metal No. 17 (a 0.50 carbon steel containing 19 per cent Ni, 75 per cent Cr, and 1 per cent Si). Since there is a fairly close relationship between hardness and fatigue resistance, this ratio was computed for previously made tests on materials of this analysis. Fatigue strength of the blade material in round specimens was then computed by means of such ratios and hardness tests taken on the blades. (The blades were too small to produce round specimens.) Numerical results are given in the adjoining table.

Fatigue Strength of Steam Turbine Blades

Metal	Brinell Hardness	Ratio Endurance to Hardness	Computed Endurance of Blade Material	Actual Endurance Limit of Blades
Cupro-nickel	117	166	19,400	20,000
Monel metal.....	212	190	40,200	37,000
Cyclops metal.....	171	250	42,800	42,500

Graft in Selling and Purchasing

Boycott is the best remedy which can be found to cure that commercial bribery which yet exists between unscrupulous selling organizations and purchasing agents (or those who specify purchases), in the opinion of M. Q. Macdonald, writing in *Purchasor*. If honest purchasing agents (which means 99 out of 100) would refuse to do any business on any price basis with concerns offering bribes to them, and cut off all commercial relations with concerns which have been publicly exposed or admit such practices, the selling graft would rapidly lose popularity because it would cost too much in lost and unapproachable business.

Progress in Iron and Steel Work

Engineering Features Receiving Most Present Attention Are Outlined Before A. S. M. E.

SPEAKING for the executive committee of the Iron and Steel Division of the American Society of Mechanical Engineers, George T. Snyder, chief engineer National Tube Co., Lorain, Ohio, and chairman of the committee, presented on Dec. 7, at the annual convention, his report of the year's progress. It was in part as follows:

Open-Hearth Furnaces

Development in open-hearth practice has not shown any radical departure in general design of furnaces or equipment. It is rather along the line of refinements, such as preheating air, insulating walls of chambers, sloping backwalls, greater recovery from waste heat in gases, and, of course, continued efforts to improve quality. As one writer puts it, "future trends will be toward larger furnaces aiming at greater tonnages and lower costs, efforts to secure more refractory linings, better utilization of present sources of heat, and better control of atmospheric conditions." There is also the question of mixing blast-furnace and coke-oven gas to secure enormous volumes of a gas sufficiently rich to serve the open-hearth as well as other metallurgical furnaces.

Multiple pouring of ingots is being used to a greater extent, and advantages are claimed. The equipment for multiple pouring requires careful mechanical designing, to be safe and effective. It is sometimes difficult to accomplish in existing plants, for lack of headroom or other clearances.

Tilting open-hearth furnaces are preferred in many cases and are being advocated for the well-known advantages of slag control, tapping, control of steel quality, and ability to patch bottoms. The mechanical equipment controlling the tilting of these furnaces seems to be entirely satisfactory.

Insulation of checker chamber walls has been much discussed, and there are many advocates. It is to be hoped that, where applied to old furnaces, these will be analyzed in all cases by careful tests prior and subsequent to the installation. The use of fans at each end of the furnace to secure better combustion control is being tried, and satisfactory results are claimed.

In England at the Merchant Iron Works Co., Middlesbrough-on-Tees, Benjamin Talbot installed an auxiliary hearth to an open-hearth furnace. This device is used to preheat the metal, be it scrap or hot iron, before it is discharged into the main hearth. It is claimed that a material increase in the output of the open-hearth furnace is thereby obtained.

Bessemer

Many mechanical improvements are possible in a new Bessemer plant, such as electric tipping, scrap charging, provision for double pouring, delayed teeming, and incidental equipment needed to reduce loss. A small amount of study and attention might increase the proportion of steel made in converters. That there are many uses for this kind of steel is well known, and improvements in the practice might readily extend these uses.

Duplex Plants

While satisfactory steels are being made in duplex plants there does not seem to be much development in the way of additional plants. The large tonnages possible make this manner of making steel attractive, although there are numerous difficulties to be encountered and great care must be taken in the selection of metal, fuel, temperature control and preliminary blowing.

Sheet Mills and Sheet Bar Mills

Continued interest is shown in the new mills which have been built during the past two or three years. F. C. Biggert, Jr., says: "If present indications are borne out by actual experience, we may expect to see sheet steel selling at prices sufficiently reduced to make possible its use for a multitude of new purposes. It should be noted, however, that this has not yet been accomplished. The new mills represent large investments and require large tonnages and large individual orders to make their operation profitable."

From an operating standpoint they are still in an experimental stage, and it is doubtful if any of them has yet shown costs lower than can be made by established methods. The following pertinent statement has been made: "Another phase of interest in this portion of the steel industry is that most of the inventions and discoveries necessary for the successful operation of the new method have been covered by patents, possibly to a greater extent than any single industry save perhaps that of wire. The rolling process and machinery and the subsequent processing, annealing, pickling, etc., all come within the scope of this protection. It would be unfortunate indeed if the situation were handled in any but the broadest, fairest manner, for which the leaders of the American steel industry are eminently fitted."

Of passing interest is the rolling in one of the American Sheet & Tin Plate Co. plants of 48-gage tin plate which "can be torn easily between thumb and forefinger." The field for the use of this very thin material is said to be limited, but its availability may develop additional uses.

The importance of progress in the art of rolling sheets is shown by the progressive development made by Weirton Steel Co. in the three periods, 1916-1920, 1920-1925, and 1925-1927, in which horsepowers progressed 4900 hp., 6300 hp., and 8500 hp., respectively, and monthly tonnages, also respectively, 8365 tons, 11,386 tons, and 13,658 tons, rolling 18-gage 5 to 6½ in. to 11-gage 5 to 22 in.

Coke Plants

Dry-quenching of coke has not made much headway in this country during 1928. The claim of a saving of 5 per cent or over 2,000,000 tons of coke per year should encourage further investigation and, if established, promote this project of cooling by continuous passage of inert gases through the coke and reclaiming the heat so absorbed by producing steam.

Rolling Mills

Additional items of interest in regard to the new mills at the Homestead works of the Carnegie Steel Co. are available. It has been pointed out that the construction of these large and modern mills on sites occupied by old mills that continued to operate called for what may be termed "emergency engineering" and for great resourcefulness upon the part of all who had anything to do with this project.

There is a dual set of mills running parallel, with motor room between and soaking pits at the end, arranged so that ingots can, when required, be fed to either mill. The buildings covering these mills are said to weigh nearly 27,000

tons and cover more than 1,000,000 sq. ft. The weight per square foot of floor space covered seems to figure out over 47 lb., which denotes very substantial construction for buildings of this type.

While this group of mills was designed for 26,000 tons a month, it is expected this will be greatly exceeded, which is not surprising, since designed tonnages in all kinds of rolling mills seem always to be exceeded, and sometimes soon after they are placed in operation.

Seamless and Welded Tube Mills

Development of this branch of the iron and steel industry has been rapid, and competition is keen. Whether to build pilger mills or some other kind seems still to be a question, and advocates of both types can undoubtedly point to finished production that satisfies customers. The combination of piercing and expanding mills followed by the usual equipment points to still larger diameters than are now being made. The enticing features of pilger mills, while calling for some elaboration in the open-hearth plants, will continue to attract attention and probably promote more mills of this type.

By-passing soaking pits, a blooming mill, and a bar mill for rolling rounds is an attractive idea that will continue to be alluring. Mr. Stiefel, however, who should be an authority in the whole field of seamless-tube making, says: (1) Output in tons with plug mill is two or three times greater; (2) cost of installation about the same; (3) tool cost of pilger mills two or three times greater; (4) rolls and mandrels for the pilger mills call for special steels; (5) maintenance and tool equipment less costly for plug mills; (6) plug-mill product is of better quality; (7) pilger mills can roll longer lengths; and finally, (8) plug mills will probably be built that can produce tubes 24-in. in diameter. The controversy, if there is one, must resolve itself into the question of cost to produce from start to finish.

Blast Furnaces

The large furnace up to about 25 ft. diameter hearth is considered good practice, and satisfactory operation of these stacks, as large or nearly as large as this, at about 850 to 900 tons of iron a day (average), is not unusual. No important improvements to stack, skip, or stoves have been noted, the changes, if any, being in details. Considerable attention has been given by blast-furnace operators and designers to the matter of gas cleaning. This matter and the ever-present problem of flue-dust production and disposition are sufficient to occupy the minds of furnace operators between casts and deserve much thought and study.

Blast furnace practice must improve, according to various authorities, through the use of better burdens, large furnaces to secure low costs, better gas cleaning to secure good results at consuming units, and the recovery of the iron content now lost in wasted flue dust. Improvements in equipment for the recovery of the iron content in blast-furnace flue dust, either by sintering or by some other method, point to the possibility of large blast-furnace operators facing a penalty, in addition to the yield loss, for all dust wasted beyond the amount known to be recoverable.

Attention was called early in the year to the German achievement of operating a blast furnace at 1000 tons a day, largely through selected burdens. They have used sintered fines from the ores, a practice which may show results in this country far beyond present conjecture. Quoting from an article printed in February this year: "Large American furnaces, if supplied with rich sintered ores, would produce far more than anything yet achieved here or abroad."

Management Engineering in Small Plants

Problems of Production Control and Grouping and Classification of Equipment; Importance of the Operating Personnel

BY J. E. DYKSTRA*

MAN POWER in industry can be directed to its highest state of efficiency only by proper guidance and proper planning. Production methods have received more attention from management engineers than have methods of selling and distribution and design. Standardization in design may well be given some consideration by plant managers, especially in plants where the product is greatly diversified and quantities are limited. If standardization of parts is given the attention it deserves, it will at once have a tendency of bringing parts through the plant in greater quantities.

Certain factors which make for efficient operation, in the order of their usefulness in establishing a workable system not entailing too great a cost to the average small industry, are:

1. Production control;
2. Grouping of equipment and its classification and possibilities of modern equipment;
3. The personnel or man power that makes successful operation possible.

Production Control

Production control can be separated into such main items as proper scheduling, routing, stores control, costing and purchasing. Many obstacles are frequently encountered in the smaller shops due to the limited quantities and the dissimilarity of parts that must often be produced by the same machinery, but machine-tool builders have demonstrated that many standard machines have built into them the possibility of caring for greatly diversified products, simply by equipping the machines with suitable fixtures and jigs. Proper scheduling can frequently be enhanced, however, by noting the requirements of the sales department over a few months.

To determine the production capacity of various departments it is essential to study in considerable detail the suitability as well as the grouping of the equipment to produce the desired part. In most cases similar equipment can be grouped together profitably for lighter machining operations. In our present age of specialization, better supervision is obtainable if lathes, turret lathes, screw machines, milling machines, etc., are grouped in their respective classes. On the heavier classes of work it is best to arrange the necessary equipment in the same sequence as the operations to be performed; in this manner the operations can usually be completed in the smallest space, with elimination of unnecessary moves.

Proper Routing

Proper routing of parts through the factory is obtainable only by keeping in mind the fact that material, when once it has left the stockroom, should travel in the gen-

*Factory manager, Champion Co., Springfield, Ohio. This is abstract of a paper read Dec. 6, at the annual meeting, New York, of the American Society of Mechanical Engineers.

eral direction of the assembly or finished-stores department, accompanied by an identification tag showing the sequence of operations as well as the departments that are to perform the work. This can most easily be accomplished by placing at the production-department's office a set of master route cards which show the sequence of operation and the various operations themselves.

To aid the department foreman as much as possible it is highly desirable to furnish the departments with proper descriptions of all operations to be performed on any one piece. These operations, readily designated by their numbers, should appear on the operation card in logical sequence. A full description of the operations to be performed should be on this card and the tool numbers of the fixtures and tools needed should be given.

Proper Costing

Almost every factory manager will agree that proper costing is a prime necessity in all departments of his plant. The mainstay of proper costing is the establishment of a time study to determine (1) best possible tooling requirements obtainable with production requirements, (2) methods of determining the time required to perform the various operations with the equipment available, and (3) an accounting of all time spent on any job.

Minimum costs are obtainable only through a system which accounts for every minute of the day that is spent by the employee in the shop. The psychological effect of knowing that every minute is recorded is generally conducive to the best effort. A simple job ticket giving the symbol of the part, together with a lot and shop order number, can be made out in the office at the time the material is ordered. It then is necessary for the department foreman only to fill in the name of the employee and the number of the machine used for the operation. This ticket, stamped at the beginning and completion of the work by the employee himself, can then be used for both progress report and costing purposes.

In considering the tooling possibilities it is always necessary to consider the tools available and the time required with these tools. With this factor known it becomes comparatively easy to determine the possible savings with more elaborate fixtures. While the more elaborate fixtures are invariably considered from a cost-reducing standpoint, it is well also to bear in mind the increased accuracy which such fixtures usually bring about, thereby frequently reducing the assembling cost of the product.

Grouping and Classification of Equipment

With any well-thought-out scheme of production control it is always necessary to provide for such emergencies as "breakdowns" of equipment. Almost every machine tool in any plant carries a designation number and these machine numbers should be carried on the departmental operation sheet as well as the time-study sheets. This at once guides the department foreman in distributing his work on hand in the departments. By grouping the machines of similar capacity and adaptability to certain work it provides at once a means for him, in case of necessity, to shift the work on hand to other machines that fall under the same classification. This gives a desired flexibility of operation not otherwise obtainable.

The possibilities of modern equipment are usually not well enough known to many factory executives. It is difficult for the department head of a factory where quantities are small to show a sufficient saving on any one product to justify the expenditure required for the purchase of modern equipment.

Many pieces of equipment in the average smaller industrial plant would be replaced by modern tools if the executive but knew their production possibilities. Many tools would be discarded as readily as the car model of a year or two ago if modern equipment were considered in terms of saving of man-hours, instead of saving in dollars and cents per unit produced, as is most generally the case.

A new up-to-date machine tool will usually save a considerable amount of time, compared with a machine a few years old, and the accuracy obtainable with the more modern machine tool is always reflected to a considerable degree in the erection or assembly costs. In spite of this common knowledge regarding modern machine tools, many shops have entirely too much equipment which, while useful, is not profitable when compared with the producing possibilities of the new machine.

While the saving possible in actual labor cost on a given product may not loom large, the fact remains that wherever a new machine is 20 or 30 per cent more efficient than the old one, the operator's effectiveness is increased to that extent. If, therefore, the average machine tool in a shop is 20 per cent less efficient than the new tools, it follows that a 20 per cent reduction in payroll could be effected by the use of the new tool.

Executives of many smaller plants fail to realize the fact that the best modern equipment pays well, even if it is difficult to show up beforehand in dollars the resulting savings, not only in the machining, but also in the subsequent assembling operations. Facts bear out the assertion that in general new equipment materially reduces the departmental overhead, through the absence of repair costs and shutdowns, but also usually decreases the general unit overhead by increasing sales that the better product often makes possible.

Man Power

Engineers should remember that the human element is not subject to the rule of cold figures. While the analysis of possibilities of the human element involved should be and is one of the mainstays of our planning as management engineers, we should ever bear in mind the fact that those directed by us can be taken over many obstacles if properly led. Industry on the whole and engineers as well have been slow to recognize the value of competent leadership.

While there are, no doubt, many men who work neither for money nor fame, but for the joy of the working, as Kipling put it, facts amply testify that in general all human endeavor is directed toward the reward that it brings. A cost-reducing plan, therefore, which does not bring its rewards and its encouragements to those who carry it out, will never attain its full possibilities.

Improvements Possible in Most Plants

Many opportunities for improvement in operating conditions in plants are neglected because of inertia in the management, according to George E. Hagemann, associate editor *Manufacturing Industries*, New York, who led the discussion on Mr. Dykstra's paper. Evidently, if best results are to be obtained, delegation of authority is essential. A company employing 300 or 400 men was cited, in which each foreman has a capable assistant who can run his department at any time it is necessary. This not only provides for accident, both physical and otherwise, but it permits the foreman to go out, when occasion arises, to inspect machinery or appliances and other equipment which are on order for the plant, and shortly will have to be used in that foreman's department.

Improvements in production control, while perhaps more to be expected in the small plant than in the large, are by no means so confined. The large plant has great opportunities for improvement, in almost every instance.

Another speaker stated that engineers in charge of design have not yet reached that peak of efficiency in their designs which is needed by progressive management. Especially is this true with regard to the standardization of parts, such as can be used for a variety of purposes by a concern doing what is essentially a jobbing business.

Adds Cold-Rolled Strip Department

Sharon Steel Hoop Co., as Part of Its Modernization Program, Completes Cold-Rolling Plant

ABOUT a year ago the Sharon Steel Hoop Co. acquired approximately 11 acres of ground adjacent to its Sharon, Pa., plant. This area now is largely occupied by modern mill buildings housing new pickling and galvanizing departments and a cold-rolled strip plant. The new construction marks the first major step in a complete modernization of the Sharon plant, and when, a short time ago, the first cold-rolled strip steel came off the new mills, the company entered the ranks of manufacturers of that product. As its name suggests, the company first was engaged in the manufacture of hoop steel and in the days of the wooden barrel was a large factor in the production of the narrow flat bands used by the cooperage industry. When the Southern cotton grower depended largely upon Northern mills for ties for baling, the company was one of the important sources of supply.

The plant, since its construction in 1900, has been devoted exclusively to the rolling of flat light-gage steel. With the rise of the motor vehicle industry, with its numerous and increasing uses of light-gage flat steel, the decline in the use of similar steel for cooperage purposes, and, on account of foreign competition, the passing of a profitable market in cotton ties, it is to be taken as an evidence of a forward looking management that the company several years ago stopped making cotton ties and went more strongly into the production of the steel called for by the automotive industry.

Out of the effort to distinguish the requirements of the motor car builders from those of other consumers developed the term "strips." The company still is a producer of hoops and bands, but with its new productive facilities, it is to be reckoned as essentially a maker of strips. Its entry into the field of cold-rolled strip steel has the backing of a record of 28 years in the rolling of hot-rolled flat steel.

Under construction at present as part of the modernization program is a continuous, electrically driven, hot strip mill, which is expected to be in operation by next March. Electrification of the plant has been another important development. One of the impressive features of the new plant is its skillful tie-up with the older sections of the works and the remarkable ease with which steel coming from the hot mills is transferred either to railroad cars for shipment or to the pickling department preliminary to further finishing.

The new structures are of notably solid construction, the columns being almost wholly of heavy single piece H beams. On account of the closeness of the plant to the Shenango River, there was a soil condition which had to be met to insure solid foundations. Besides the use of concrete piles, there is a 4-ft. bed of tamped slag topped by concrete in which have been laid creosoted wood block floors. There is an air of solidity and permanence to the new structure, and lighting and ventilation are of the character which helps to make the working place attractive. The efficiency of the plant has gained appreciably, as the records of the plant since completion of the new section show that a larger tonnage is being turned out with one less working turn per week.

The 8-in., 9-in., 10-in. and 14-in. hot strip mills, which have been in operation for a number of years, parallel each other, as shown in the accompanying plan. These mills discharge their strip, either in cut lengths or coils, into the No. 1 loading building. From this building the strip is either loaded directly into the cars or taken to the No. 2 loading building or the pickle shop storage building, by roller bearing trucks and tractors.

From the pickle shop storage, the coils in sizes up to 10 in. wide are fed through continuous pickling tanks, washers, dryers, and then to multiple head coilers. The wide coils and the cut strip are put on special Monel racks

Stands of the 10½ and 21¼ x 26-In. Cluster Mills, Together With Reel and Coiler

and handled by cranes into pickle and wash tanks, then to dryer or roller levelers and oiling machines.

There are two sets of continuous pickling tanks. The first set will handle eight rows of strip in widths up to 6 in. This set consists of one long pickle tank, water, muriatic acid and lime tanks. There is also a pull-up machine for galvanizing, and a galvanizing pot, which is fired with natural gas.

From the galvanizing pot the strip is fed to an eight-head coiler. Each head is provided with a small roller leveler, which takes out any corrugations that may have developed in the strip in the hot mills or during the pickling. The heads on this coiler are driven with individual motors, which have a variable speed of 6 to 1 and there is also a 2 to 1 gear shift, giving a total speed change of 12 to 1. The strip is pulled through the tanks by this coiler at a constant speed by means of an automatic control which slows the motors down as the coils increase in diameter.

rewinders, polishing machines, oiling machines and shears.

The first roughing mill consists of four stands of 10½-in. and 21¼-in. by 26-in. cluster mills set tandem, about 15 ft. center to center of stands. These mills are driven by 200-hp. variable speed motors, on each pass, and the delivery speed ranges from 125 to 375 f.p.m. It is possible to control the complete mill from any stand, by means of push buttons.

The reel and coiler are driven by variable speed motors and are synchronized with the mill. The reel on the cluster mills mentioned can be adjusted for a maximum pull of 4600 lb. The other reels have maximum pulls in proportion to the sizes of the mills.

The coilers are of the five-roller type, with special guide rollers for holding the coil in place, during the coiling operation.

The second roughing mill includes three stands of 8½-in. and 16½-in. by 18-in. cluster mills, set tandem at about

A 10½ x 18-In. Finishing Mill With Accompanying Reel

The second set of continuous pickling tanks are about the same as the first except that they are wider and will handle 16 pieces of strip. There is no galvanizing pot in this set. The coiler has 16 heads. Every other head will coil strip up to 10 in. wide and the alternate heads up to 6 in. wide.

The coils are loaded on trucks by cranes at the coilers and then taken either to the cutting up machines, to the cars for shipping, or to the cold-roll plant.

There is a loading dock along the east side of the pickle and cold-roll plants over 1000 ft. long. Part of this loading building has a crane runway for open car loading. Between the pickle and cold-roll plants there is a covered runway so that the pickled strip is never exposed to the weather.

The cold-rolling plant is about 250 ft. north of the pickle shop. This intervening space is reserved for extensions to either of the plants. The rolling equipment consists of three sets of tandem roughing mills with reels and coilers and complete handling equipment for material and rolls. There are seven sets of finishing mills with auxiliary equipment the same as the roughing mills. Other finishing equipment consists of slitters, roller levelers, edging mills,

15 ft. center to center of stands, and with reel and coiler. A fourth stand about 35 ft. from the third, with 8½-in. and 16½-in. by 26-in. rolls, is set in tandem, so that it can be used with the other three stands or can be used as a single mill. It also has a reel and coiler. This mill is driven with 150-hp. motor on each stand.

The third roughing mill is a three-stand tandem, two-high, mill with 10½ x 10 in. rolls. This mill has a set of driven edging rolls before the second and third stands for the purpose of producing square edge material. This mill has a reel and coiler, the same as the other mills.

The finishing mills comprise two stands of 13 x 18-in. rolls, two stands of 10½ x 18-in. rolls, two stands of 8½ x 10-in. rolls and one stand of 18 x 26-in. rolls. These mills are all equipped with variable speed motors. The reels are also driven with variable speed motors with adjustments for variable tension on the coils. Six of these mills are equipped with edgers which are driven from the mill motor.

All of the mills are equipped with roller bearings. The cluster mill bearings are Timken and the two-high mills are Rollway. The cluster mills and the 18 x 26-in. finishing mills have motor driven screwdowns, with a motor on

Multiple Head Coiler Used in Connection With the Continuous Pickling

each screw, and a magnetic clutch between the drives, so that the screws can be operated separately or together, as desired, by a system of push button control.

The auxiliary equipment consists of slitters, portable coilers, polishers, roller levelers, portable shears, oiling machines and scrap bundling machine. All of this equipment, which, with the mills, was built by the E. W. Bliss Co., has a capacity for making cold-rolled strip any gage up to ¼ in. thick and any width up to 22 in.

A roll grinder, furnished by the Norton Co., has equipment for grinding the barrel of the rolls either straight, concave or convex.

There are three flying shears, built by the Hallden Machine Co., which will straighten and cut the finished strip in any length up to 16 ft.

The annealing department equipment consists of four double, box annealing furnaces, which are hand fired. There are cast steel annealing boxes and bottoms, and the necessary equipment for drying and handling the gas to the boxes. A 50-ton crane serves an annealing bottom with the charge and cover complete.

In the annealing furnace building there are two Leif Lee heaters, which furnish the heat for the cold-rolling plant. These are located so that the coal and ash handling equipment can serve them in the same way as it does the annealing furnaces. This equipment includes a track hopper and coal elevator, which discharges coal into boxes or ashes from a bin into a standard car or truck. The coal boxes are moved by an overhead crane to the different furnaces and the ashes are taken from the furnaces by this same crane to a bin adjacent to the coal elevator.

Another addition to our rapidly growing list of technical handbooks is a 383-page volume just issued by the American Oil Burner Association, 342 Madison Avenue, New York. It was edited by Harry F. Tapp of the association. It is intended to supply to those interested authoritative information concerning problems of combustion and heating, as needed in the practical application of oil-heating equipment. The volume, which is priced at $3, is in flexible binding and thin paper so that it will fit the pocket.

On the Right Is the Charging End of the Continuous Pickling Tank, While the Foreground Shows a Part of the Pickling Shop Storage

Reheating Furnaces for Alloy Blooms

Soaking Chamber Forms Part of Furnaces Designed by Timken Company—Hearth Has Three Zones —Refractory Recuperator a Feature

REHEATING high-quality alloy blooms on a quantity production basis has been provided for at the new mill of the Timken Steel & Tube Co., Canton, Ohio, by the installation of two large continuous reheating furnaces, especially designed for the work. The furnaces are of the triple-fired, recuperative type, using natural gas for fuel and having a capacity of 40 tons per hr. each.

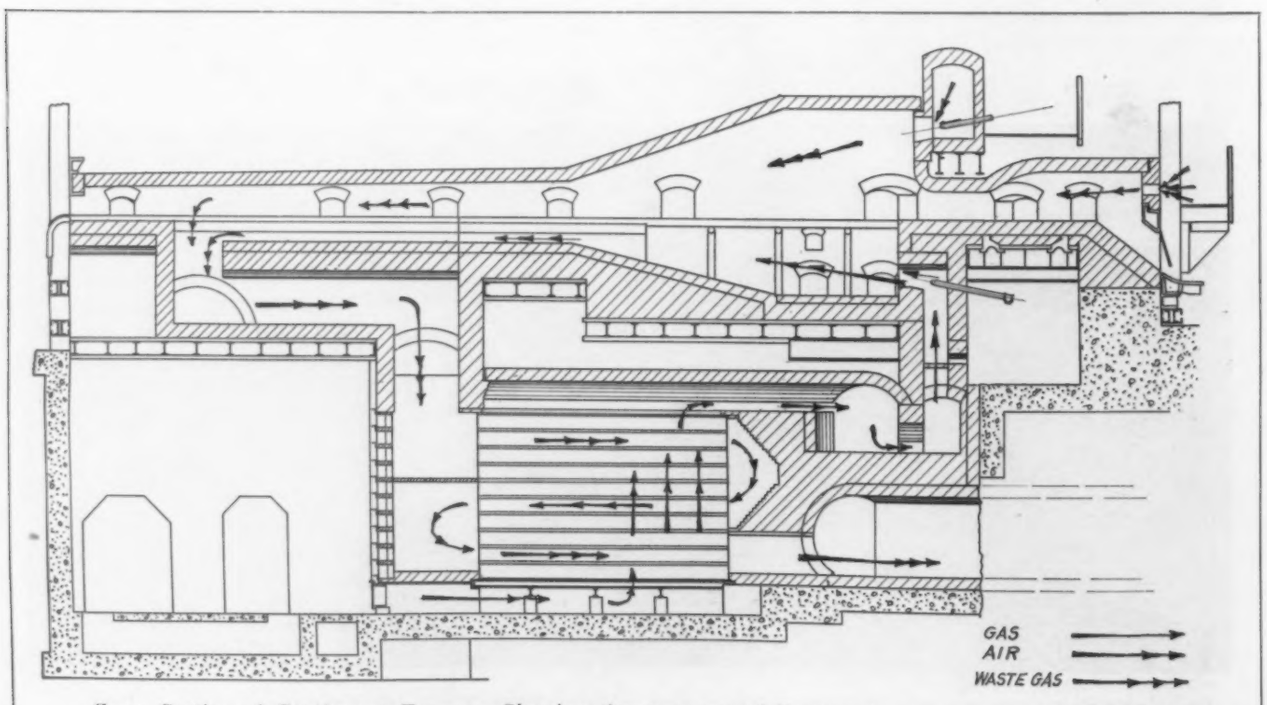
Blooms are brought directly to the charging end of the furnaces by a live roll table running from the main transfer table and are pushed through the furnaces by means of a motor-driven pusher mechanism. Due to the quality of the steel, extreme care must be taken in the heating of these blooms, which accounts for some of the features in the design and construction of the furnaces. Upon entering the furnaces, the blooms are gradually warmed in a 10-ft. dead end, next passing through the channel and main heating chamber, and last receiving their final soaking at a temperature of approximately 2200 deg. Fahr. on a brick hearth. From this hearth the blooms are discharged by gravity directly to a second run-out table that carries them to the 28-in. mill which serves as roughing stand for subsequent rolling operations.

These furnaces are the first of their kind ever built and put in operation, and incorporate a number of interesting features in construction and design. As they are precisely alike in all details, a description of one will serve for both. In over all dimensions they are 67 ft. long, 33 ft. wide and 26 ft. high at one end and 27 ft. 9 in. at the other, above foundations. The hearth is 63 ft. long and 20 ft. wide with a roof height that varies from 3 to 7 ft. The furnaces extend a maximum of 15 ft. below ground level.

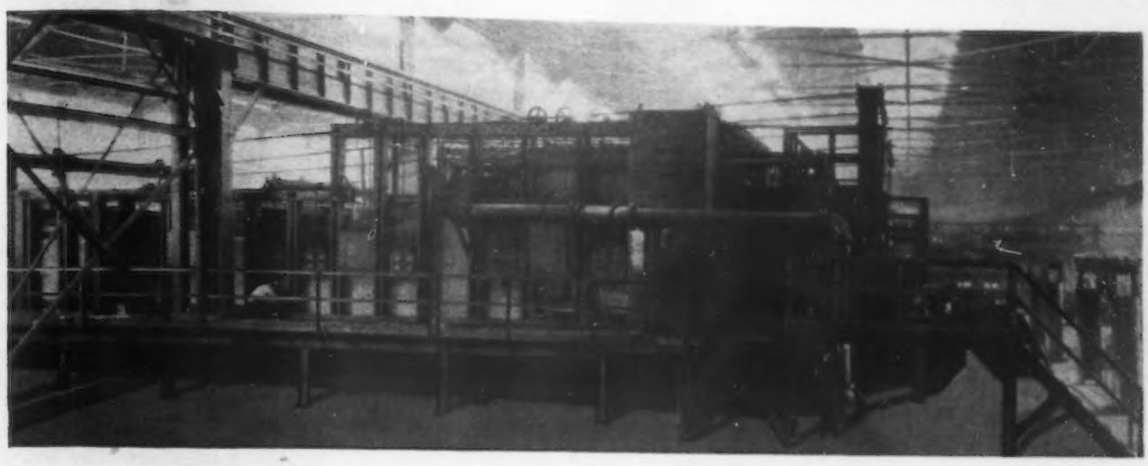
The section shown in one illustration gives an idea of the construction and general arrangement of the furnace interior. The main furnace chamber is divided into three zones—the first for gradual warming, the second in which the main heating is done, and the third, which consists of a soaking chamber for equalizing heat throughout the bloom before discharging. The latter compartment, the soaking chamber, is one of the features in the design. In this chamber, only sufficient fuel is fired to supply radiation losses and maintain the entire soaking hearth, sidewalls and roof at constant discharge temperature. Practically no heating is done here, this chamber being used to equalize the temperature throughout the steel and to soak the entire bloom to the same heat condition.

The soaking chamber accomplishes two important things. First, it serves to insure even heating of blooms, removing dark spots caused by contact with water-cooled skids in the heating chamber; and second, it makes independent of each other the temperature condition of the steel and the tonnage output. Due to the soaking chamber, tonnage output can be changed at will by adjusting the burners located back of the soaking hearth without in any way affecting the quality of heating found in the discharged blooms.

The roofs on all three chambers are of flat arch construction, supported from overhead girders. This type roof



Cross Section of Continuous Furnace, Showing Arrangement of Heating Compartments and Recuperator



General View of the Two 40-Ton Reheating Continuous Furnaces for Alloy Steel Blooms

for wide furnaces such as these is found to make for uniform flame distribution and heating throughout the 20-ft. width of the furnace.

The entire length of the furnace chamber is liberally provided with working and inspection doors located in both side walls, care having been taken, however, that the doors be thickly lined and tightly fitted, to eliminate heat losses from the furnace interior.

Hearth Construction of Three Sections

The construction of the hearth proper is also somewhat unusual. Taken as a whole, it may be considered as divided into three sections, according to construction. The first section, which extends from the charging door to a point 27 ft. into the interior, is of standard firebrick construction. Extending along its length are four firebrick piers, on which are mounted the skids on which the blooms slide. These skids are water-cooled, the skid proper consisting of two concentric steel pipes. The inner carries cooling water to the extreme end, the return being made through the outer. The pipes are all connected to a common header, so that there is a continual circulation of water through the system.

In the second section of the hearth, as can be seen from the drawing, the brick supporting piers are dropped away from under the skids, which are supported by cross pipes bent to a rectangular form. These pipes are of the same construction as the skid pipes, and are supplied with water from the same header, forming part of the general closed circulating system. This hearth construction has been adopted to provide combustion space for the burners firing beneath the blooms and to permit ready circulation of the heat below the steel, so that the cooling effect of the skid pipes will be minimized and the soaking period reduced when the blooms reach the soaking chamber.

The hearth in the third section is of solid firebrick construction, steel bars set almost flush with the firebrick taking the place of the water-cooled skids. The lintel of

Motor - Driven Pusher Mechanism for the Two Furnaces. The centralized control is shown at upper left

the discharge door is also water cooled, to form a rigid front wall support across the 20-ft. span as well as to carry the hinged doors. The discharge doors consist of a number of hinged steel plates that are swung outward by the impact of the blooms against them.

Three Tiers of Burners Provided

As the triple-fired name implies, there are three tiers of burners incorporated in the heating system of this furnace. One tier is located at the discharge end for maintaining the soaking chamber at the desired temperature. The other two tiers are located behind the soaking hearth, one firing above the blooms near the roof of the main heating chamber and one located below the level of the hearth, firing beneath the blooms. These two latter tiers determine the tonnage output of the furnace, the intensity of the heat from this point back to the charging door being controlled to give the proper temperature for any desired tonnage output.

Between the two heating compartments the flat arch roof is lowered to form a restriction to the flow of gases from the soaking chamber into the main heating chamber. This restriction is a very important point in the design of these furnaces since it makes possible the maintenance of a slight pressure in the soaking chamber to prevent the infiltration of cold air up the discharge slope through the flap type discharge doors. It is extremely important that scale losses be kept low, due to the cost and quality of alloy steel. The infiltration of air and resulting oxidation so noticeable on the ordinary type of end-discharge furnace is reduced to a minimum by means of the lowered roof between the soaking and heating chambers.

Control to Be Made Automatic

The control of the main heating system is manual at the present time, but is to be changed over in the near future to an automatic fuel-air proportioning system working in conjunction with an automatic draft regulator.

The highest flame temperature obtained in this type furnace is found in the main heating chamber back of the hearth, where the steel is being rapidly heated and where the tonnage output is controlled. The main heating chamber ports are so arranged as to use highly preheated air with the natural gas fuel. Since the steel is colder at this point of the furnace than in the usual design of end-discharge furnace, it is possible to adjust the temperature so as to bring about an extremely rapid heat transfer to the blooms, thus increasing the heating efficiency of the furnace without detracting from the high quality of the heated product.

Refractory Tile Recuperator Under the Furnace

The pre-heated air is delivered to both the main heating chamber tiers of burners under positive pressure by the refractory tile recuperator, which is situated beneath the furnace proper and is arranged in three units. The central recuperator unit furnishes its preheated air to the underfired burners; the two outside recuperators deliver preheated air to the overhead firing ports by means of two steel ducts which are insulated and brick lined.

The waste gases travel through the furnace to the downtakes 10 ft. from the charging door where they are led beneath the hearth to the three recuperators. The heated gases travel horizontally through the recuperators, making three passes, each successive pass being at a lower level until the gases are discharged from the recuperator to the stack flue at a temperature of approximately 700 deg. Fahr. The heat given up by the waste gases in passing through the recuperator heats up the hollow refractory tile through which air for combustion is passing vertically upward.

A collecting chamber is situated at the top of each recuperator unit, where the air is collected from all the ducts of each recuperator and thence led to the main heating chamber firing ports.

Blooms are charged to the furnace directly from the runout table by a double rack type pusher. A general view of the pusher is shown in another illustration. The motive power is supplied by a 120-hp., 220-volt, direct current, mill type motor, which is directly connected to a reduction unit common to both rams. The total reduction of speed is 83 to 1, giving a ram speed of 17.4 ft. per min. The load capacity of each ram is 82,000 lb. horizontal push. The shafts of all pinions, gears, and idler gears throughout the drive including the rack pinion, are mounted in Timken bearings.

Diffusion of Solid Carbon Carburizes Steel

CARBURIZATION of iron and steel occurs when the metal is heated in contact with solid carbonaceous materials, or with carbon monoxide or methane gas or melted cyanide. Two theories have been advanced to explain this action. One is that a gas, such as carbon monoxide is the carbon carrier; it diffuses into the steel and reacts with the iron to form cementite according to the reversible reaction.

$$2CO + 3Fe = Fe_3C + CO_2$$

The other theory is that the gas is decomposed by contact with the surface of the metal, depositing carbon soot which then diffuses atom by atom into the hot iron, entering the solid solution as austenite.

Experiments Support Decomposition Theory

The latter theory is supported by recent experiments by G. Takahashi, published in *Science Reports*, Imperial University, Sendai, Japan, July, 1928. He finds that a pure iron tube with 1 mm. wall evacuated inside and stoppered, and then bathed outside in CO at atmospheric pressure, is carburized throughout to about 1.5 per cent carbon in 10 hr. at 1000 deg. C., but the gas pressure inside has crept up meanwhile to only 80 mm. Almost complete decarburization was effected in similar fashion with CO_2 but the interior pressure rose to only 92 mm. Other experiments showed that hydrogen diffuses through the hot tube walls readily, but CO, CO_2 and N hardly at all. If, therefore, deep seated carburization readily occurs while CO gas is penetrating but slowly, the effect must be due in most part to diffusion of solid carbon. This conclusion is also in line with x-ray studies of austenite, which indicate that carbon is dispersed within the interspaces of the iron lattice as carbon atoms and not as the compound Fe_3C (cementite).

Eye Accidents and Industrial Eye Strain Increasing

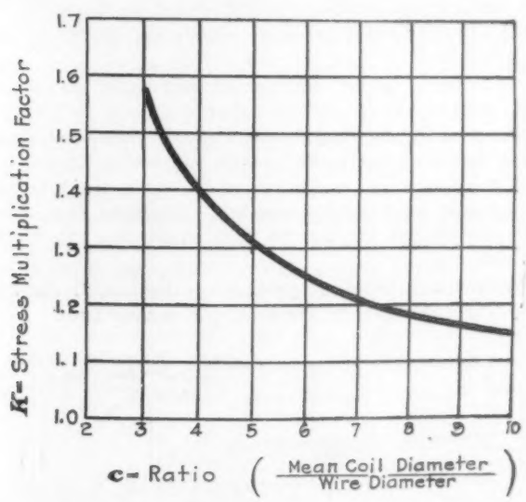
"Safety first" has brought down the number of accidents in industry to a gratifying extent, but the most distressing kind—preventable eye accidents—still comprises the most serious industrial hazard, according to Lewis H. Carris, speaking before the Safety Congress, Syracuse, N. Y., Dec. 6. Furthermore, the number is on the increase. He estimates that American industry pays $10,000,000 yearly compensation to blinded workmen, and the loss to them and their families is much greater. Eyestrain from dark working places or from glare is more prevalent, and represents an equal economic loss, although it does not figure in compensation statistics. The remedy is constant use of approved goggles, helmets, and scientific lighting, and an informed cooperative attitude between employers, workmen and the medical profession.

Causes of Failure of Coiled Springs

Corrections Determined for Design Tables—Rough, Decarbonized Surfaces Detrimental—Mild Corrosion to Be Avoided

A SPECIAL research committee of the American Society of Mechanical Engineers, under the chairmanship of J. K. Wood, has fostered a number of researches into the properties of springs. Definite results have been obtained in some lines, and were reported at the general meeting early in December.

It is common experience that heavy, closely coiled helical springs—such as used in railroad rolling stock—frequently fail even though working under loads well within the supposed safe limit. The common type of failure is a detail fracture starting at the inside of the coil; it is usually attributed to faulty heat treatment. A. M. Wahl, research laboratory Westinghouse Electric & Mfg. Co., East Pittsburgh, analyzed the stresses by approximate methods, then performed tests on loaded springs and spring segments



Correction Curve for Spring Tables

Divide coil diameter by wire diameter, run up on corresponding ordinate to curve, then across to left and read factor. Multiply stress given in spring table by this factor to get maximum stress actually existing in spring

which verified the theoretical results. Agreement was also close to the results of a much more rigorous mathematical analysis of the problem published 25 years ago in Germany, but generally neglected by designers, probably because there has been no experimental verification until Mr. Wahl's work. He now finds that the stresses at the outer diameter of the springs are materially less than those given in the accepted spring tables, while those at the inside of the coil may be as much as 2.5 times as large as at the outer diameter. Hence he concludes that failures in service are ordinarily caused by overloading at this critical region. He also suggests factors taken from the adjoining curve to convert the tables given in handbooks into safe design data.

Among several commentators who admired the elegance of Mr. Wahl's work, G. M. Eaton, Molybdenum Co. of America, Pittsburgh, said that the problem of spring breakage will not be solved until more attention is given to the steel manufacture and the spring fabrication. In his opinion many avoidable defects originate in a poor ingot surface (due to splashes, surface segregates or thermal stresses), persisting through to the round rod from which the spring was made. An even greater danger to the finished spring is the thin decarbonized surface left after rolling, coiling and heat treatment. The gross result is that the most highly stressed fiber in a spring is least able to withstand its load because of faulty mechanical and chemical conditions.

Corrosion Reduces Endurance Limit

D. J. McAdam, Jr., metallurgist United States Naval Engineering Experiment Station, Annapolis, Md., has cooperated with the committee in determining fatigue limits of spring materials under various conditions. His results confirm the general discoveries already made for other materials; namely, that the endurance limit (defined as the alternating load which can be withstood indefinitely without fracture) is proportional to the ultimate strength, but only when the metal is protected from corrosion. Since the strength of spring steel is much higher in its quenched and tempered condition than in the annealed state, it would be surmised that a properly heat treated spring could endure correspondingly higher vibrating loads without breakage than the metal would in a softer temper, and actual tests show this to be true. However, McAdam's experiments also show that this advantage is more than lost if the metal is subject to such mild corrosive action as running tap water; furthermore, that a notched specimen, hardened, has an equally low endurance limit to a notched annealed specimen. If a spring therefore is to withstand changing loads, as in railroad service, the importance of making it of a smooth bar and of protecting it from corrosion can hardly be overemphasized.

Light-Weight Diesel Engines for Vehicles

Progress in Diesel engine building is along two distinct lines, according to *Industrial Bulletin* of Arthur D. Little, Inc. For one thing, it may be constructed so as to operate on any one of several different fuels, such as powdered coal, tar, fats, or vegetable oil, although heavy petroleum products will doubtless be its staple fuel for many years.

A second line of development is toward lighter weight. More horsepower per pound of engine is the result of improved design with stronger alloys and higher speed of operation. Diesel-driven trucks are giving excellent results in England; in fact, one of the new dirigibles being constructed for the British Government will be powered by engines of this type using heavy oil fuel. The Sperry Diesel, developed especially for airplanes, weighs about two pounds per horsepower. Diesel engines, burning heavy oil, are now operating on Russian railroads; oil-electric engines are fairly common in America.

The Diesel is preeminently a high-compression engine, but on account of its own distinctive methods of carburetion and combustion, it does not "knock." A difficulty not entirely overcome is the comparative inflexibility of the Diesel engine, which runs best at constant speed. Moreover, there is difficulty in starting, and high maintenance cost. All these problems nevertheless seem in a fair way toward solution.

Good Practice in Jig and Fixture Details

Principles Governing Locating, Clamping, Arrangement of Jig Legs, Bushings, Latches and Other Elements

BY JOSEPH W. ROE*

PRESSURE due to the feed and rotation of the cutter should be against the solid part of the fixture, not against the clamp. This principle is often violated, as the wrong way is usually more convenient. (Fig. 1.)

In general the feed should be against the rotation of the cuttter, not with it. This avoids a tendency to dig in. This has been good practice for many years. There is, however, some tendency away from this of late years.

Locate the feed and cuts to throw the burrs for the various cuts on the same side, to reduce burring operations as far as possible. In order to be sure that burrs do not vitiate correct setting in subsequent operations, it is wise

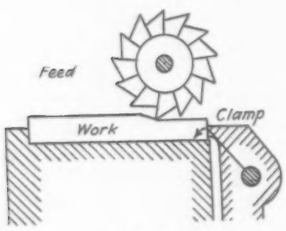


Fig. 1

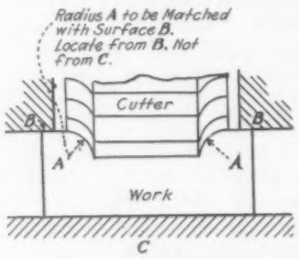


Fig. 2

to provide clearance grooves on locating surfaces so that burrs cannot, even if left on, interfere with correct setting.

Locating Surfaces Should Be Small

Locating surfaces should be as small as consistent with proper support and wear. The larger the surface, the more care and time are necessary to keep it clean and free from chips which destroy proper setting.

If a surface is to be matched in a milling operation locate from that surface as at *B*, Fig. 2. It may be more convenient to locate from the opposite face, but locating from the matching surface, is correct and produces better work. A variation in the thickness of even a half of a thousandth

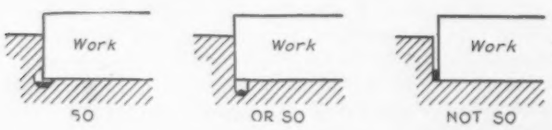


Fig. 3

will show, although it may not affect the operation of the piece.

Avoid sharp corners between locating surfaces. They catch dust and dirt and are hard to clean. (Fig. 3.)

The number of fixed supports should not be more than three. These should be as far apart as possible. If other supports are needed they should have only spring tension against the work during clamping and be locked in position after the work is set.

It should be easy to keep the locating surfaces clean, therefore, there should be ample clearance for chips. If possible accumulated chips should fall away from, rather than on to the locating surface when the work is removed. If possible keep the locating surfaces completely covered by the work, so that chips cannot collect on them.

All the locating surfaces of a jig or fixture should be fixed. Movable surfaces should be used for clamping only.

Buttons or pins, hardened and ground, are often better for locating than flat surfaces as they are easier to keep clean and afford easier adjustment for wear. They are better when acting endwise than sidewise, as there is no bending action and they are more readily set up for wear. (Fig. 4.)

It is better to support castings on buttons or pins than on flat surfaces. They position better and more definitely. Surfaces which locate drop-forgings should have clearance for the flash, and preferably should be located from one side of the flash only, as the dies which made the forging may not have been exactly matched. Locating from the upper side of the forging, or that above the flash, is preferable.

The clamping should not produce any horizontal sliding action across the locating faces as this causes wear.

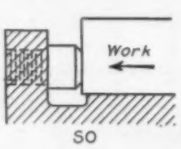


Fig. 4

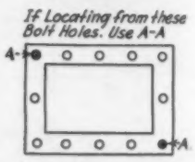


Fig. 5

Locating and supporting points should be as far apart as the nature of the work will allow. (Fig. 5.)

The locating and support points should be visible and easily accessible to the operator.

Work Pieces Not to Be Stacked

Do not stack pieces one against another, if accuracy is required. In multiple work each piece should be located independently against fixed stops. In well-designed fixtures this is done, although several pieces may be clamped by one motion.

In multiple milling fixtures do not mill the pieces serially, with a single cutter, if the runs are long. Use multiple cutters, one for each piece and feed across the row. This reduces the length of feed and therefore the cutting time. This applies, of course, to fixtures with a reciprocating feed, not to those with rotary, continuous feeds.

Parts of the fixture requiring accurate location should be held by screws and dowels or splines. The screws should not have to perform the double function of locating and holding. (Fig. 6.)

When locating blocks are assembled into fixtures it is sometimes desirable to arrange the screws and dowels as shown in Fig. 7. When arranged this way, the contacting surface only is hardened, leaving the section carrying the

*Professor of industrial engineering, New York University. The article is taken from Professor Roe's paper, "Principles of Jig and Fixture Practice," presented Dec. 3, at New York, before the American Society of Mechanical Engineers.

Formulas for determining the probable profit on proposed jigs and fixtures, as well as other tooling equipment, and some general principles of fixture design, were also features of Professor Roe's paper. These were given in THE IRON AGE of Dec. 13, page 1489, and Dec. 20, page 1575, respectively. The paper concludes with a bibliography of books, technical papers and magazine articles relating to jigs and fixtures.

dowel pins soft, so that the reaming of the holes and the alinement of the piece can be done after hardening.

Where the positioning need be only in one direction, the side of the piece or preferably a tongue and groove may

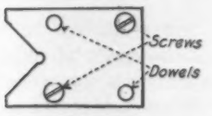


Fig. 6

Fig. 7

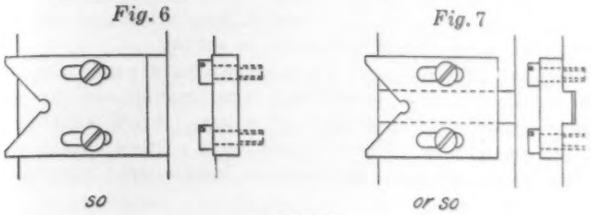


Fig. 8

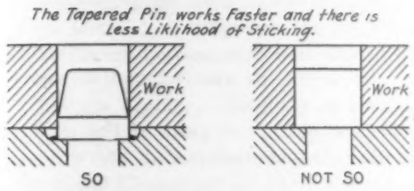


Fig. 9

be used for locating, and the screws go through slotted holes. (Fig. 8.)

If position pins are used for locating a previously drilled hole, that portion which is full diameter should be as short as is consistent with wear, and the rest or upper part of the pin tapering. (Fig. 9.)

Locating pins should be hardened and ground with clearance for burrs and chips. When used with counterbored holes they should center on only one diameter.

When two pins are used for locating one should be flat-

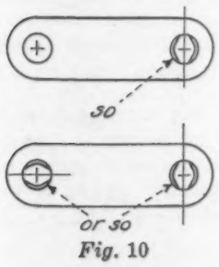


Fig. 10

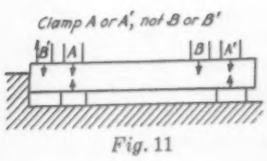


Fig. 11

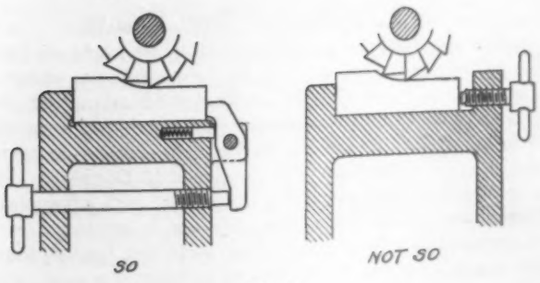


Fig. 12

tened, on the sides toward and away from the other pin. (Fig. 10.) Sometimes it is desirable to flatten both pins, the planes of the flattening being at 90 deg. as shown in the lower figure.

If one pin is higher than the other, preferably the larger one, the work can be seated more rapidly.

Principles Relating to Clamping

Under no circumstances should the line of clamping pressure come above the stop. If it did there would be a tendency to lift the work. Side clamps should press downward as well as inward. (See Fig. 1.) By so doing the clamping tends to seat the work.

The clamp should be immediately opposite the supporting point, with solid metal between. Disregard of this leads to springing the work, or lifting of the work due to the support acting as a fulcrum. (Fig. 11.)

Clamps and adjusting points should be operated from the front or working side of the fixture. (Fig. 12.)

The tool thrust should be taken up by an adequate, fixed stop, not by the friction between the work and the clamp. Clamping jaws should, if possible, be at right angles to the direction of the cut, not parallel to it.

All the clamping strain should be cared for within the fixture itself. None of it should be transmitted to the table of the machine.

Cams or wedges, if used for clamping, should be so designed that the pressure and feed tend to tighten them, not to loosen them.

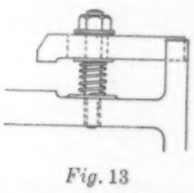


Fig. 13

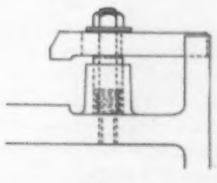


Fig. 14

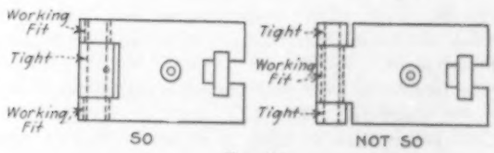


Fig. 15

Clamps should have springs and washers under them so that the operator will not have to hold them back while inserting the work. (Fig. 13.) A better form, with the spring concealed, so that chips cannot interfere with it, is shown in Fig. 14.

To save time in loading and unloading a fixture, clamps which have considerable motion should, in order to clear the work, have a rapid action when free from the work and a slow motion with increased power when they are brought into contact with it. A variety of devices are available, such as the toggle-joint, bayonet screw, interrupted thread, slotted clamp, etc.

Clamps holding castings and irregularly shaped surfaces should be on the floating principle to enable them to adapt themselves to the shape of the work.

Legs, Bushings and Other Jig Details

The center of gravity of the jig, with the work in it, and also the thrust of the drill should lie within the geometrical figure formed by the supports. This avoids a tendency for the jig to lift or tip.

A drilling jig should have four legs. With a three-legged support, it will rest stable on any surface. If a chip is under one leg of a three-legged support the fact will not be detected. With a four-legged support the jig will teeter if it is on an uneven surface or a chip is under one of the supports.

Supporting strips or lugs are sometimes better than legs as they are less likely to drop into T-slots or holes in the machine table.

Loose or screwed-in solid bushings should not be used where accuracy is important. Where screwed-in bushings are necessary they should center on cylindrical surfaces, not on the threads.

The length of bearing for the drill should, in fixed bushings, be about one and one-half to two times the diameter of the drill; in slip bushings about two to three times the diameter of the drill. If the bushing is longer than this,

the remainder of the length farthest from the work may be relieved.

Bushings should not be located close to the work with the object of carrying the chips up through the bushing except when the holes to be drilled are in a machined face that is clamped against a similar face in the jig. It is better, when the design will permit, to allow the chips to clear between the work and the bushing. About one drill diameter is usually sufficient. For small holes where great

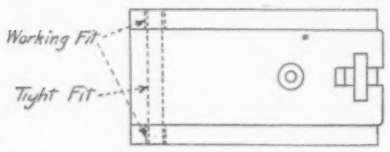
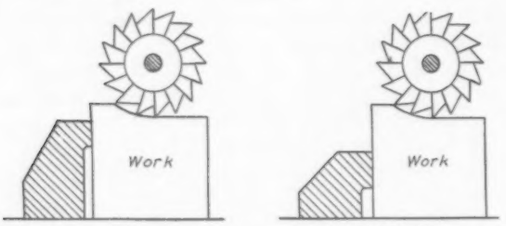


Fig. 16

Fig. 17



accuracy is required the bushing should be brought down close to the work. For drills smaller than No. 31 this dimension may be approximately 1/64 in. with drills ground with a flat point.

In the joint of a latch give the latch the widest possible hold on the hinge-pin. (Fig. 15.)

A still better type of latch is shown in Fig. 16, which gives better side support when in working position. If possible avoid placing clamps in a latch which carries drill bushings, as any clamping pressure has a tendency to spring the latch and throw the bushings out of alinement.

Preferably a jig latch should have a support or stop to hold it when it is thrown back. This lessens the possibility of misalinement through use.

It may be of advantage to have the hinge pin tapered. This permits readier adjustment for wear, etc.

Thumb-Nuts and Levers Eliminate Wrench Handling

Thumb-nuts, fluted nuts, and levers should be used where the quantities are large, as the necessity of handling wrenches is thus avoided. They should be large enough to give the required pressure easily. When it becomes necessary for an operator to use a mallet, time is lost and either the work or the fixture is likely to be sprung.

Thumb-nuts and hand knobs should have ample clearance around them to permit their being manipulated properly and to avoid possibility of injury. Avoid knurling nuts and handles. When covered with cutting lubricant they are irritating to the operator's hands under constant use.

If it is necessary to use a wrench in setting the work, the various nuts should preferably be of the same size, so that change of wrenches is not necessary.

All exposed screws, nuts, and lugs, the motion of which might catch the operator, are to be avoided, and all sharp corners and edges should be removed.

The operator's hands must be well clear of the cutters during the insertion, clamping, and removal of the work.

There should be no danger of destruction of the work, tool, fixture, or machine through the over-running of the cutter.

It is desirable to have the cutting zone as close to the machine table as possible. If, for some good reason it must be high, then the surface taking the thrust of the cut should be high; i.e., as nearly in line with the cut as possible. (Fig. 17.)

It is desirable that parts subject to wear be renewable without destroying the jig or fixture.

Nature of "Blue Brittleness" in Steel

SHORTLY after the war a committee of the National Research Council presented a long report on "blue brittleness" of steel, embodying all the facts then known. The phenomenon shows itself in Armco iron as follows: if a series of tension tests is made at varying temperatures, the curve representing the way strength varies with the temperature shows a peak and the corresponding curves for elongation and contraction show a valley at 250 deg. C.

This abnormality is not associated with any crystallographic, magnetic, electrical or thermal changes. Consequently, Prof. K. Honda argued that it probably could be found in other metals which harden by cold work. When such a metal is stretched beyond the elastic limit, it is automatically hardened and strengthened, this action continuing as it necks down.

Annealing wipes out this work hardening and softens the metal, but moderate reheating relieves only the most unstable of these internal strains, and increases the hardness further (a fact proved by experiment). There should therefore be some temperature where the effect of heat and cold work are additive and result in an upward hump in the strength-temperature curve and the opposite condition in ductility.

Assuming that the shape of these curves is the criterion of blue brittleness, T. Inokuty studied the tensile properties and hardness of other metals from very low to moderately high temperatures. He finds similar inflections in the curves as follows: (*Science Reports*, Imperial University, Sendai, Japan, July, 1928) Aluminum from 100 below to 200 deg. C.; tin from 100 below to 30 deg. C.; zinc, in the vicinity of 120 deg. C.; copper, from 20 to 500 deg. C.; lead from 130 below to 40 deg. C.; brass from 100 to 500 deg. C. He concludes that "blue brittleness" is therefore not unique to iron and steel, but is characteristic of metals which can be work hardened and then softened by moderate heating.

Coke Oven Gas for Steel Plants

Asserting that coke oven gas excels most kinds of fuel used in iron and steel work as to its usefulness, composition, calorific value and the possibility of extracting its full heat value, G. Bulle of Düsseldorf, Germany, in a recent article in *Archiv fur das Eisenhüttenwesen*, discusses some firing devices which have been developed in Germany. In his opinion coke oven gas can be and is used with advantage either alone or mixed with blast furnace or producer gas. For furnaces in steel works, rolling mills and forges, coke oven gas can be substituted without difficulty for coal, but in the case of shaft furnaces its use is somewhat limited.

Discussing firing devices, he states that some special technically perfect ones have been developed for using coke oven gas. There are a large number of coke oven gas burners, some of which merely lead in the gas while some others aim at a preliminary mixing of the gas with air. A series of them work also by a secondary stream of air or gas. He says gas burners fully depend on the possibility of regulating the flow of gas, on the short flame or the power consumption. In his opinion holders are required for storing this gas because the supply is regular while its consumption is more or less irregular.

BOOK REVIEWS

The Need for Efficiency in Consumption

Economics of Consumption. By Warren C. Waite. Published by McGraw-Hill Book Co., New York. Price, $3.

If economic theory is to be of any use as a guide to industrial and trade policy today—and it is doubtful whether it has been of any such use in the last 50 years—the greatest need in economic literature is for an original, systematic treatise on consumption.

Economists, since the beginnings of political economy as a distinct field of systematic thought, have been preoccupied with questions of production of wealth and its distribution among the factors of production. Governmental policies, taxation, tariff protection, labor questions, international trade, money and banking, and nearly all of the more modern specialties in the field of economic discussion have been, and still are, approached from the point of view of production.

This has been a natural result of the "efficiency economy" in which most of human history so far has been passed. The main question, in most countries, practically up to the beginning of this century, has been how to turn out enough goods to supply basic human needs, and how to assure each class in society a fair share of them. Despite the unprecedented rapidity of industrial development in the Western nations, this is still true for the world as a whole, for there are vast sections of the human race who still live in a deficiency economy and whose main problem is to produce directly or by trade enough to satisfy even their barest wants.

But for the principal industrial nations, and particularly for the United States, the economic problem has changed its aspect. Our concern is not so much with products and processes, as with consumers and markets. Generally speaking, our technological equipment and resources enable us to satisfy any demand quickly and cheaply. In business language, industry and trade now operate in a buyers', not a sellers', market.

Some of our problems of production, particularly in their human aspect, have perhaps been solved rather by brute force than permanently and satisfactorily, but for the present they do not worry us. Give us a customer and we'll turn out the goods. Before the perplexities that capricious sovereign, the consumer, causes us, the relation of government to industry and other problems of production become insignificant. All our elaborate structure of economic theory explaining the best way to produce goods collapses or becomes purely academic, and we are driven back upon empirical or pragmatic principles of conduct, the rule of thumb and trial and error.

Not only are manufacturers, traders and advertisers forced to guess what people can and will buy and why, but for the economist and the statesman the complex relation between consumer purchasing power and business prosperity has become a vital question wrapped in obscurity, despite the efforts of those Gold Dust twins of American economics, Foster and Catchings, to clarify it. In this fog of uncertainty the searchlight of statistics, upon which we have come to rely so greatly for guidance in production policies, fails to penetrate far or is so dissipated and distorted that our faith in it as a measure of general business conditions is being shaken. In fact, in our understanding of the problems of consumption we are exploring an uncharted sea with only a rude compass, largely ruled by ethical or moralistic principles or prejudices.

A real treatise on consumption that would systematize our fragmentary knowledge and build up a coherent and comprehensive theory of the market would be to the modern economic world what "The Wealth of Nations" was to the 18th century; but it must be written by someone who is not merely an economist, but also a biologist, a psychologist and an experienced observer of human nature and conduct, without any prejudices about it. Books like Professor Waite's will not serve the purpose, though they may stimulate or irritate others to do some original thinking about the subject. His work is a competent, routine textbook. Its contents list most of the topics that one would expect to be discussed under the head of "consumption," and the text says a little of this and a little of that about each one, but without illuminating or enlivening any of them.

The net result of the book is nothing approaching a fertile conception of the essential problems of consumption and their significance in our business system. Professor Waite, at the end, does indeed vaguely treat a few such ideas as "efficient consumption," and throws out a few promising chips of thought by the way, such as that "the nation with the more efficient consumption must eventually drive the less efficient from the markets of the world." But he does nothing with them, and after wandering around among bits of doubtful theory about the incidence of taxation, a few statistics of the cooperative movement and extravagant praises of standardization, he ends where most discussions of consumption end—on a pious note of hope that "the consumer may be educated to better modes of consumption and stimulated to a pride in efficient consumption."

Books like this are disappointing to the business man, whose interest in the puzzles of consumption is not academic but immediate, direct and concrete, and even to the professional economist, who today is hard put to it to maintain his reputation for knowing something more about the mysteries of business than the business man himself knows.

Virgil Jordan.

Covers Engineering in Concise Handbook

Handbook Encyclopedia of Engineering. Pages 1242, 4½ x 7 in., flexible binding. Published by the Industrial Press, 148 Lafayette Street, New York. Price, $6.

Based on the same alphabetical arrangement as one or two other useful handbooks of the encyclopedic type, the first edition of Machinery's Handbook of Engineering, edited by Franklin D. Jones, associate editor of *Machinery*, has been published. Essential facts are given on about 4150 subjects in mechanics and engineering, including physical and chemical properties of structural materials and their applications, manufacturing equipment and processes, mechanical laws, rules and formulas, principles covering the design and use of apparatus for generation and transmission of power, metallurgy of iron and steel and non-ferrous metals, definitions of many words and expressions used in mechanical work and data important to designers and builders of mechanical and electric apparatus.

Divided into 24 alphabetical thumb-indexed sections, the book is handy for reference and the headings stand out in bold type for easy scanning. Cross-indexing is a valuable feature, of aid in locating many subjects. Illustrations in the shape of line cuts are used where they are beneficial to the full understanding of the text. Tabular matter is employed sparingly for giving data in connection with a number of the topics.

There is some use of mathematical expressions, but for the most part the work is away from the highly technical and leans strongly to the practical side of the matters discussed. The type is splendidly readable and the appearance

of the pages excellent. It should be of great assistance to engineers engaged in a wide variety of work and doubtless will take its place promptly alongside Machinery's Handbook of machine shop and allied practices.

S. G. K.

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Industrial Safety from Many Angles

Industrial Safety Organization for Executive and Engineer. By Lewis A. De Blois. Pages, 328, 6 x 9 in., 20 illustrations. Published by the McGraw-Hill Book Co., New York. Price, $4.

"Safety first" not being a sufficiently comprehensive slogan, the author is helping expand its comprehensiveness to include "safety all the time" and "safety for all, everywhere." He goes into the questions of accident mortality, fatality (or frequency) rate, injury frequency rate proper, also injury severity rate; classifying accidents and injuries by causes; shows that investigation, analysis and prevention are increasing, and that they pay; gives the requirements for safety and places the responsibility for accidents; lays down the general qualifications for a safety engineer; takes up the purpose and structure of safety committees; points out the advantage of stimulating rivalry in the "game" of accident prevention.

Safety rules, which necessarily differ for various industries, as well as for different grades of intelligence in the workmen, and even for different races are treated minutely, as are the general protective principles of activities for securing safety appliances for buildings or equipment, and personal protection.

If I had written the book, I would have mentioned a method that I have employed, when the union would not prevent: namely, not merely refusing remuneration to the one causing an accident by contributory negligence, but fining him who caused it by carelessness.

The influence of distraction, fear and fatigue, as well as of youth and inexperience, is taken up in sufficient detail; those of lighting and inspection less thoroughly; that of temperature not at all.

The typical specimen Safety Committee reports given are good guides for the preparation of such documents.

R. G.

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Properties and Uses of Metals and Alloys

Metallurgical Handbooks. "Werkstoff-Handbuch Stahl und Eisen," 200 loose leaves, 6 x 8¼ in., leather binder, edited by Karl Daeves for the German Iron Institute and published by Stahleisen, Dusseldorf, Germany. "Werkstoff-Handbuch Nichteisenmetalle," 185 loose leaves, 6 x 8¼ in., leather binder, edited by G. Masing, W. Wunder and H. Groeck for the German Society of Engineers and published by Beuth, Berlin S-14, Germany. Price, 18 gold marks each.

An exhibit of structural materials in Berlin a year ago had as one of its numerous features the issuance of two note-books on the properties of metals. One is on iron and steel, the other on non-ferrous metals and alloys. Together, they are a compendium of information on the properties of metals and alloys, methods of testing them, and practical applications and uses. The books are in the form of data sheets in loose-leaf note-books, and it is planned to issue additional and revised sheets at six-month intervals.

The two volumes are conceived along somewhat similar lines, outlining first the general properties of the materials, then uses and applications in practice and finally the various properties of particular alloys. The general plan seems logical and makes for ready reference.

The volume on iron and steel consists of five sections, one section on mechanical and physical properties of the metals and the methods or machines for testing them (including 18 headings, such as strength, hardness, fatigue, magnetic, electric, wear and corrosion), one section on alloys of particular origin or composition (including 16 headings, such as carbon steels, austenitic steels, silicon steels, chrome-vanadium steels and cast iron), one section on materials for particular applications (including 23 headings, such as magnet steels, rustless steels, tool steels and locomotive steels), one section on heat treatment and microscopic examination and a final brief list of specifications, in form resembling those of the American Society for Testing Materials or of the Navy.

The books are, obviously, a compilation on the present state of the art in applying metals in industry. For the American reader, then, it will be convenient to indicate the scope of the books by comparing them with our most recent reference book on similar topics, namely, the handbook of the American Society for Steel Treating. The latter corresponds in manner of treatment rather closely with the German volume on iron and steel. Even the contents and the data themselves are quite similar.

It is indeed hardly surprising to find that the steels in use in the two countries are almost identical when used for similar purposes, since interchange of publications has made information mutually available. The rustless irons, the stainless steels, the silicon transformer sheets and dynamo sheets, the heat-treated alloy steels and indeed almost all special steels are recommended for essentially the same purposes, in the same compositions and the same conditions of heat treatment in the books from the two countries.

In the treatment of the subjects, however, there are certain differences. These differences in treatment suggest, and are probably the result of a difference in the position of metallurgical science in industry. It is generally held, and with much justification, that scientific thought and invention in metallurgy have in the past been more advanced in Germany than in the United States. Admittedly, the Germans have been masters of painstaking technique; and in the field of invention one must remember their priority, for example in stainless steels (Strauss, 1911) and duralumin (Wilm, 1910).

On the other hand, it would seem that in the metal trades the application of scientific thought has been much more widespread in the United States than in Germany. The variety of heat-treated alloy steels, the knowledge of details of applications in industry and the dissemination of knowledge to the so-called practical man is much more satisfactory in our country. Those who concede a superiority in scientific method and technique to Germany can still find comfort in the fact that the average refinements in manufacture are on a much higher level in the United States.

These relations of science to industry are reflected in the treatment of subjects in the German and the American handbooks. Many of the subjects in the German volume are discussed from the standpoint of the investigator in the research laboratory, and although they are never abstruse, they nevertheless often deal with the nature of the materials instead of stressing the practical results of these investigations. In other words, they are scientific books and (very properly) deal with principles.

Two instances serve as examples. The section on magnetism is a complete discussion of the properties and methods of test, and includes no less than nine wiring diagrams for test apparatus. The section on cast iron is a quite thorough treatise on the nature and properties of that material —not the method for making it, but an intimate study of its properties when made.

The advantages of such thorough scientific treatment are obvious. On the other hand, there is lacking in these volumes a sufficiently satisfactory practical treatment. Two instances from the American handbook will emphasize the point. For certain kinds of detailed practical directions, a "Recommended Practice Committee" has assembled the best

current thought on the state of the art, and has given details enabling any intelligent manufacturer to put the material into actual use at once. This is found in a number of instances in the American handbook. The other example is the article on cutting efficiency and tool performance, which finds no counterpart in the German handbook.

The examples illustrate a slightly different spirit in treatment, and it is felt that the German volume could to advantage improve its contents along the lines indicated, while at the same time preserving its own distinctive good qualities.

The volume on non-ferrous metals covers a wider field and is therefore necessarily less complete in its details. Nevertheless, a large amount of information is compiled. Section A is a general introduction. Section B treats the general mechanical properties including hardness, strength, wear resistance and machinability. Section C discusses microstructure, chemical analysis, corrosion tests, X-ray spectrometry and potentiometric measurements. Sections D to G cover the various properties of copper, brass, bronze and aluminum; section H treats of duralumin and related alloys; section J cast aluminum alloys; section K magnesium and its alloys; section L tin, lead and zinc; and section M nickel, manganese and chrome. In other sections are outlined the properties of the noble metals, silver, gold, the platinum metals, the amalgas, tantalum, bismuth and cerium. The final section gives a summary of alloys having specific properties—heat-resisting alloys, acid-resistant metals and alloys, bearing-metals, metallic coatings and the metal spray process.

The two volumes can be recommended as a highly useful summary of present-day metallurgical art.

Marcus A. Grossmann.

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Value of College Education Analyzed

Relation of Education and Income. By Everett W. Lord. Pages, 32, 6 x 9 in. Published by Alpha Kappa Psi Fraternity, Indianapolis. Price, 50c.

In 1926 the author, who is director of education and research of the national professional fraternity in commerce, enlisted the aid of the various chapters of his organization, and secured uniform data concerning education and income from 7400 individuals in all walks of life. A study of the results (utilizing "medium" values rather than averages) indicates that elementary education adds $64,000 to the life earnings of the grammar school graduate. High school adds a further $24,000; a bachelor of arts degree adds $56,000 more, while a professional degree adds a further $94,000. Thus the fortunate owner of a LL.B. will (on the average) earn $238,000 more than an uneducated day laborer during his life.

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The International Labor Organization

"The Work of the International Labor Organization" is the title of a 198-page book, selling for $2.50, published by the National Industrial Conference Board, New York.

Formed under the Treaty of Versailles, the International Labor Organization has been in existence nearly 10 years and is characterized as "in many respects the most vigorous and active section of the machinery of the League of Nations."

How this international body is organized and what it has accomplished is set forth in considerable detail. While some degree of world-wide standardization of labor conditions is regarded as inevitable as international relations become more interwoven, the author points out that the degree of uniformity to be aimed at and the features of employment conditions that should be regulated by international agreement are debatable questions.

The International Labor Organization is commended particularly as a clearing house of information. The data it collects and distributes on the various phases of industrial employment, as well as on the character and effect of regulatory measures in force, may provide the basis for action by individual nations in dealing with their own particular problems.

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Foreign Trade Bibliography

A selected bibliography of foreign trade, listing about 120 titles, has been published by the National Foreign Trade Council; copies may be had from the council, Hanover Square, New York, at 25c. each. The pamphlet is published as a guide to the standard books and reference works most widely used by American foreign traders. Theory, practice, merchant marine, trade with Latin America and with the Far East, and other topics are covered. A suggested "five-foot foreign trade book-shelf" of 40 essential books is listed.

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The advantages of steel-frame buildings in resisting earthquakes is discussed in a paper entitled "Earthquake-Resistant Structures," by Wendell M. Butts, civil engineer, San Diego, Cal., which was presented in January, 1927, before a meeting of the Los Angeles section of the American Society of Civil Engineers, and has recently been made available in pamphlet form by the American Institute of Steel Construction, Inc., 285 Madison Avenue, New York. Considerable engineering data are offered, as well as a chart showing the comparative resistance of different types of structures to recent earthquakes.

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The annual of the association of French iron masters, the Comité des Forges de France, is again a formidable volume of 1360 pages. It contains a list of members of the association, which includes all of the metallurgical companies of France, with information as to the officers and nature of their products. As in earlier volumes, there is also a directory of the companies, by locality and by the nature of the products, and a classified directory of the suppliers of apparatus and equipment for the iron and steel industry. Reports are printed, also as usual, of the various organizations within the industry, working more or less under the patronage of the organization of iron masters. The headquarters of the Comité are 7, Rue de Madrid, Paris (8e).

New Books Received

Labor Management. By G. S. Watkins. Pages 726, 5¾ x 8¾ in. Published by A. W. Shaw Co., Cass, Huron and Erie Streets, Chicago. Price, $5.

Production Design. By J. K. Olsen. Pages 212, 6 x 9¼ in., illustrated. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, $3.

Book of Business Standards. Second edition. By J. George Frederick. Pages 255, 5 x 7½ in. Published by Commercial Standards Council, 19 Park Place, New York. Price, $2.

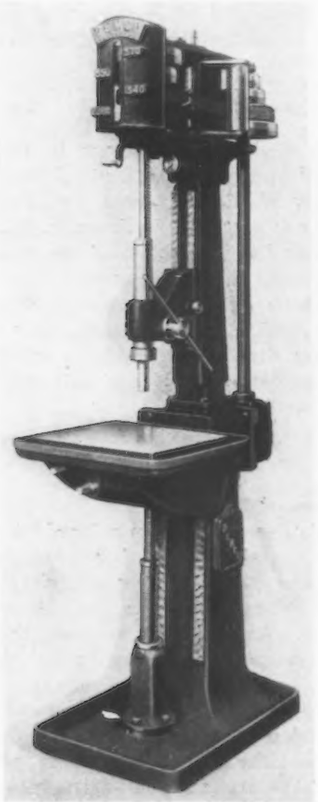
Journal of the Iron and Steel Institute, No. 1, 1928. Pages 1023, 5½ x 8½ in., illustrated. Published by the Iron and Steel Institute, 28 Victoria Street, London, S. W. 1., England.

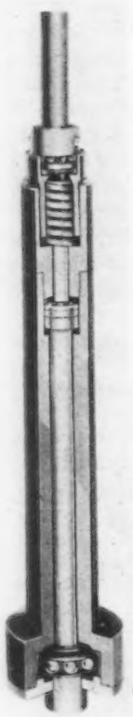
Iron and Steel Institute Carnegie Scholarship Memoirs. Vol. XVII. Pages 190, 5½ x 8½ in., illustrated. Published by Iron and Steel Institute, 28 Victoria Street, London, S. W. 1, England.

Keeping Fit by Easy Exercises. By Maj. George T. Everett. Pages 100, 5¾ x 8¾ in., illustrated. Published by Ronald Press Co., 15 East Twenty-sixth Street, New York. Price, $2.

New Sensitive Drilling Machines

ARRANGEMENT of the spindle, which automatically compensates for its own wear, is a feature of a model K sensitive drilling machine which has been brought out by the Demco Division of the Merit Equipment Co., Cleveland. The machine can be furnished for either belt or motor drive, with from one to six spindles and with hand or power automatic feed. All revolving parts are carefully balanced and are equipped with ball bearings.





When Motor-Driven, a Motor Replaces the Gear-Box Unit of the Belt-Driven Drilling Machine. Ball bearings in the spindle are automatically compensated for wear by means of a spring, the arrangement being shown in the sectional view at the right. The sliding head, belt shifter and automatic constant-pressure idler are other features

The patented spindle, a sectional view of which is shown, is accurately ground and is provided with two driving splines. The ball bearings are housed in a dust-proof quill, and are automatically compensated for wear by means of a spring. The sliding head which holds the spindle has a long adjustable bearing and is counterbalanced. It is clamped to the column by means of a single handle. The lever for hand feeding is adjustable.

The automatic power feeding mechanism is mounted on a sliding arm. The feed worm and gear are always in mesh and run in oil in a housing, which has a graduated dial plate upon which the depth to be drilled may be set and locked. When drilling is completed the feed disengages automatically, the spindle returns to the starting point, and immediately feeds down again. The feed can also be set for semi-continuous operation, the spindle being advanced by hand from its upper position and the automatic feed becoming operative when the hand feed lever is released. The spindle can be raised or lowered by hand while the power feed is in operation.

Tight and loose pulleys are provided for the standard belt-driven machine. The power is transmitted through a pair of hardened steel spiral bevel gears, which run in oil in a gear box, to the rear vertical shaft that is inclosed in a steel tube. On single-spindle machines a standard 1200-r.p.m. motor is substituted for the gear box and is direct connected to the rear vertical shaft by means of a slip coupling. For multiple-spindle machines a standard 1200-r.p.m. motor may be mounted on a separate bracket at the base of the pedestal and belted to a single pulley on the jackshaft. Snap switches are regular equipment on motor driven machines, but push-button control can be furnished.

The top bracket, cast in one piece and braced front and rear, contains the bearings for the front and rear cones and also houses the belt shifting mechanism and the automatic belt-tension idler, each of which is a separate unit. The drive from the rear cone to the spindle cone is by means of endless flat belt. The belt shifter has two forks and is operated through a small crank handle at the front of the machine. One revolution of the handle produces a change of speed, the various speeds being indicated on the guard plate at the front of the top bracket. The idler is under constant pressure against the belt, the pressure being relieved automatically the moment the shift handle is turned, this being accomplished through a cam with spring tension. Belt tension can be adjusted by means of a small handwheel under the bracket. Cones and idler units can be removed by lifting their respective bearing caps at the top of the bracket.

Table clamping and elevating screws are extended to the front of the table. The base of the pedestal forms a lubricant tank and a standard pump, which may be belted to the rear of the drive shaft, can be furnished. Coolant is returned to the tank by a flexible tube.

Adjustable Snap Thread Gages

FOR convenient and rapid gaging of external threads the Taft-Peirce Mfg. Co., Woonsocket, R. I., has placed on the market the thread gage illustrated, which is an application of the conventional snap gage principle.

This gage "gages a thread with a thread," the gaging members being true thread forms ground in the faces of hardened tool steel anvils and correct in all thread elements. Annular rolls or straight grooves are not employed. Elimination of moving parts, rotating, floating and sliding members, which might quickly become worn and inaccurate is emphasized as insuring lasting accuracy.

The gages may be accurately set with a reference plug gage or by means of wires and measuring blocks to any pitch diameter within their range. The threaded anvils can be furnished for any pitch and any percentage of thread engagement desired. Eight sizes are carried in stock, the smallest having a range of ¼-⅝ in. and the largest, 3 9/16-4 in. Standard "go" and "not go" anvils are ¾ and ⅜ in. long, respectively. Special lengths can be furnished.

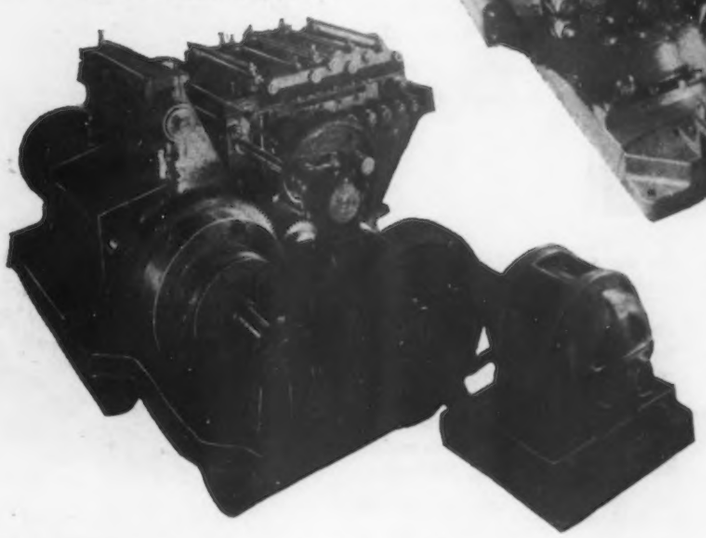
Gaging Members Are True Thread Forms Ground in the Faces of Hardened Tool Steel Anvils

Sales of mechanical stokers in November totaled 116 units with 30,938 hp., as against 100 with 27,219 hp. in October, according to the Department of Commerce. For the 11 months ended with November, the total was 1388 stokers with 459,475 hp. as against 1291 stokers with 451,400 hp. for the corresponding period of 1927.

Automatic Flying Shear for Strip Steel

Straightener and Cutting Machine Takes Metal to 48 In. Width

DESIGNED to straighten and cut to length both hot and cold-rolled strip at a continuous uniform speed, a machine containing both straightening and cutting elements has been brought out by the Hallden Machine Co., Thomaston, Conn. The metal does not stop while it is being cut to length, because the shear unit moves forward, during the cut-off period, with the same speed as the metal feed. This continuous feed of the metal prevents the flattener rolls from marking the metal during the cut-off period. Patents are pending.



Combination Flying Shear and Straightener Rolls. Shear is at left, below, and at right is other illustration

No tripping mechanism in front of the machine is used, the length of cut being regulated by a special mechanism which indicates directly from the feed rolls. This makes it possible for the cut pieces to fall directly into a rack, which can be removed by a crane when full, or on to a conveyor or inspection table. A change in length of cut is accomplished merely by setting a pointer on a scale. The machine does the rest automatically.

This machine is now built in three sizes: No. 4 for 24-in. width of metal, No. 5 for 36-in. and No. 6 for 48-in. This model is suitable for anything from thinnest gages up to ¼ in. thick. The machine can be ganged up with a rolling mill, trimmers, slitters, etc., where a uniform, continuous feed is required. In this way an entire operation can often be saved, with its handling expense.

In design this is primarily a steel mill type machine—very heavy and rugged, with a low center of gravity. The height of the metal feed-line from the floor is very low, making it easy to gang up this machine with existing machines. The machine can be operated readily with unskilled labor. If it is desired to operate as a flattener only, the shear clutch can be disengaged. The machine is stopped and started readily by a Farrel-Birmingham clutch between the motor and flattening stand.

The flattening stand has nine-roll flattener with two pairs of feed rolls. The rolls are of chrome steel, hardened and ground, and all rolls are driven. The flying shear is made of steel castings, with shear blades of grade tool steel. The top and bottom blades are interchangeable, each with four cutting edges. The shafts are of 0.50 per cent carbon alloy steel. Bearings are all bronze bushed, the fast running journals having ring lubrication.

Foundrymen Announce Winners of Prizes

The board of awards of the American Foundrymen's Association announces that the committee appointed to select the three prize-winning convention papers for 1928 have chosen the following:

"Temperature Measurements of Molten Cast Iron," by H. T. Wensel and W. F. Roeser.

"The Effects of Lead on the Properties of a Complex Brass," by O. W. Ellis.

"Reducing New Sand Cosumption in a Steel Foundry," by H. A. Mason.

H. T. Wensel is associate physicist and chief of the pyrometry section of the Bureau of Standards, Washington. W. F. Roeser is assistant physicist in the pyrometry section of the Bureau of Standards with Mr. Wensel. O. W. Ellis is metallurgical engineer in the research department of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. H. A. Mason is assistant to the superintendent of the Gould Coupler Co., Depew, N. Y. The prizes are $100 in cash.

The board of awards announces that the prizes will be presented at the 1929 convention. It also states that similar prizes for papers presented at the 1929 Chicago convention will be awarded for papers on any of the following subjects: gray iron, steel, malleable cast iron, nonferrous metals, sand control, general foundry practice. Only one paper in any class will be awarded a prize.

Spiegeleisen Imports Small This Year

Imports of spiegeleisen, according to official data obtained from the Bureau of Foreign and Domestic Commerce of the Department of Commerce, have been at a much lower rate this year than in 1927 despite an increase in consumption.

Last year, 7460 tons, or 621 tons per month, was received, the largest imports being 2195 tons in May. For the first 10 months of this year, or to Nov. 1, 1928, only 2820 tons, or 282 tons per month, had been received. The largest imports this year were 1130 tons in September. The total value of the 7460 tons imported in 1927 is given as $223,463, while the 2820 tons imported for the first 10 months of 1928 is reported as having a valuation of $79,588.

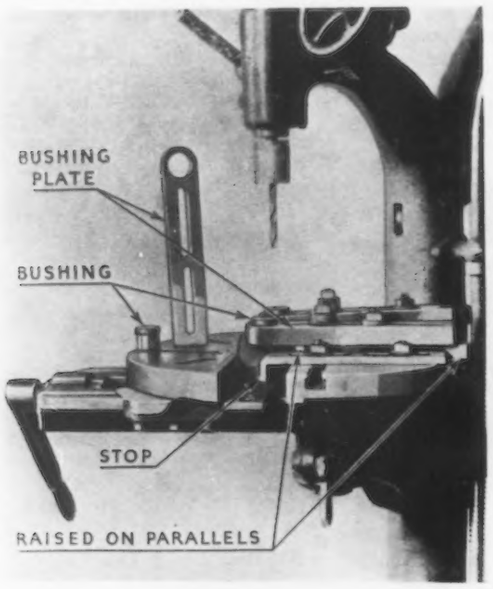
A drop of 10,012, or 8.7 per cent, in the total immigration for the current fiscal year is reported, as compared with the corresponding months of last year. All of the principal sources of present-day immigration show a decrease, but Europe is now contributing a larger proportion of the total. From July 1 to Oct. 31, 1928, the total number of immigrants was 104,545. Europe supplied 52,480, Canada, 25,901, and Mexico, 19,369.

Universal Jig for Drill Table and Vise

A SPECIAL slotted stop and bushing plates are offered by the Modern Machine Tool Co., Jackson, Mich., to be used as a universal jig in conjunction with the combination drill table and vise. The stop is bolted to the top of the combination and extends over the opening of the vise. The work is then placed in the combination, against the stop. Bushing plates, with bushings of proper size, are then located over the work as required, one to four bushings being used.

The plates may be bolted to the table, using the slots in the table, or they may be set on parallels to any height required by the work. By raising the bushings slightly out of bushing plates, the center distance between bushings may be easily determined with a micrometer. Bushing plates are designed to fit standard bushings.

This enables users of the combination drill table and vise to use this jig for any class of work. In many shops, where repeat processes are necessary at frequent intervals, a sample piece clamped in the vise may be used to adjust the stop and bushing plates for drilling duplicates.

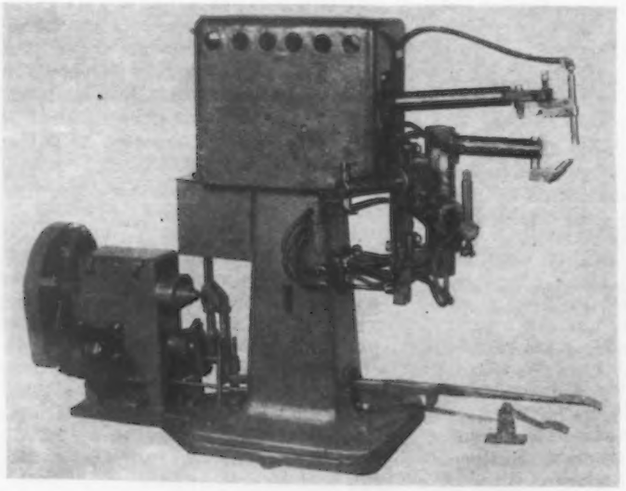


Slotted Stop and Bushing Plates Used as a Universal Jig, with Combination Drill Table and Vise. This arrangement has great flexibility and the set-up may be repeated as required, a sample piece being used as a gage

Special Equipment for Spot Welding Boxes

A MACHINE for welding boxes that require several different electrode combinations in order to reach all corners is shown in the accompanying illustration. The design includes a multiple electrode holder that swivels from one position to another so that all parts of the assembly can be reached without extra handling.

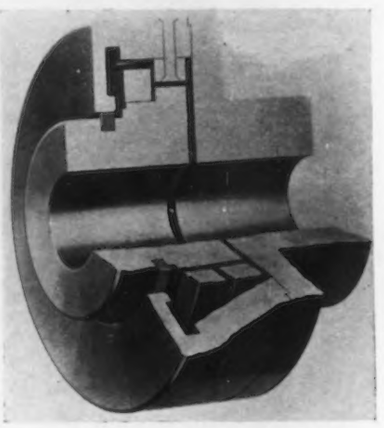
The machine is built by the Thomson Electric Welding Co., Lynn, Mass., and is designated as the model 176-C special. It is rated 15 kw. and is either foot operated or power driven. The power drive is either by belt from the lineshaft or by motor and is through a six-speed gear box. The lower terminal post swivels to three positions and the horns and dies in the post are adjustable both horizontally and vertically. The upper die also swivels horizontally and may be adjusted vertically.



The Multiple Electrode Holder Swivels So That All Parts of the Boxes Are Welded Without Extra Handling

All-Metal Flexible Coupling

AN all-metal flexible coupling designed to take care of ordinary conditions encountered in a direct drive has been placed on the market by the T. L. Smith Co., Milwaukee. In this coupling, designated as the style B Flex-Ring, flexibility is furnished by means of two long ring-shaped springs, which, it is stated, permit end play of motor shaft without any sliding action and effectively smooth out the shocks and vibrations in the drive. The coupling is also said to compensate for a large amount of both angular and offset misalinement without causing excessive bearing loads.



Flexibility Is Furnished by Two Long Ring-Shaped Springs

Arrangement of the coupling may be seen in the illustration. The cast steel hub has two projections machined to fit the gaps in the driving springs and is provided with a recess for the felt packing used to retain grease in the housing. The housing, of semi-steel and machined all over, carries two keys corresponding to the lugs in the hub. These keys are set into machined recesses in the housing and are riveted into place. The flange is also of semi-steel and is machined all over. The heat-treated springs are machined to fit over the projections on the hub and the keys in the housing. Flange and housing are bolted together and all inside parts are held in position without snap rings or bolts.

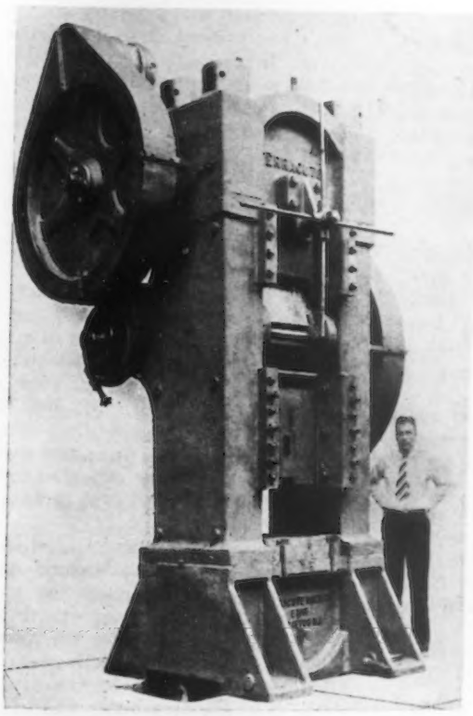
The 77 establishments engaged primarily in making saws reported products valued at $22,627,990 in 1927, a decrease of 8.4 per cent under a production value of $24,709,211 reported by 71 establishments in 1925, according to the Bureau of Census.

1000-Ton Upper-Toggle Coining Press

AN upper-toggle press capable of exerting 1000 tons pressure has been added to the line of the Ferracute Machine Co., Bridgeton, N. J.

Tensile stresses are taken by four 8-in. diameter vertical steel rods shrunk in the columns. The toggles are of cast steel and have hardened and ground steel bushings. The steel toggle-links are bronze bushed and the steel toggle pins are hardened and ground. The pitman is of cast steel and is bronze bushed. Vertical adjustment of the ram is obtained by a horizontal wedge which is operated by a screw and capstan hand wheel. The weight of the adjustable head and the moving mechanism is taken by two compression springs on the top of the press.

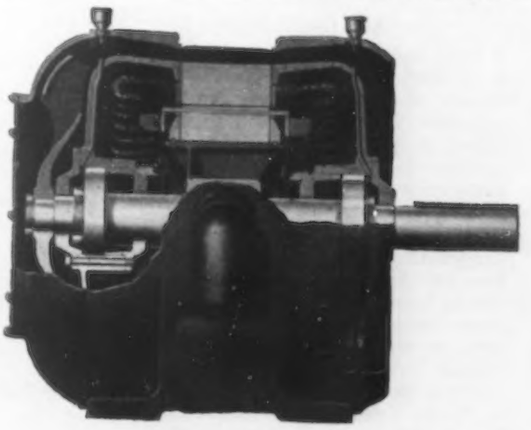
The main gear is a steel casting and the pinion a steel forging; both have cut teeth. Main and backshaft bearings are bronze bushed. The press is equipped with a jaw clutch and the ram with a knockout. Lubrication is by means of a force system. The press illustrated has 2½-in. stroke but the same machine with longer stroke can be furnished. The distance between columns, right to left, is 32 in., and the depth of bed, front to back, is 36 in. The height, bed to ram, at top of stroke and adjustment, is 20½ in., but this may be changed. The press has direct motor drive and makes 30 strokes a minute.



Sturdy Construction Is a Feature of the 1000-Ton Toggle Press, Which Is Arranged for Direct Motor Drive

Inclosed Fan-Cooled Electric Motor

A NEW line of totally inclosed, fan-cooled motors, of 1 to 50 hp., has been developed by Allis-Chalmers Mfg. Co., Milwaukee. All of the active parts, such as stator core, stator winding and the rotor, are completely inclosed, preventing contact of outside air, dirt, dust, fumes, moisture, etc., with the interior or active parts.



At the Left Is Shown the Fan Which Forces Air Around and Across Parts Which Conduct the Heat from the Interior, an Inclosing Jacket Controlling the Path of the Cooling Air

Heat is carried away by a sufficient volume of cooling air forced around and across those parts which conduct the heat from the interior to the outer surfaces. A circumferential air jacket controls the path of cooling air.

Conference of Statisticians Sees Active First Quarter

"The year 1928 as a whole has been a year of industrial and commercial activity slightly higher than in the preceding year, but little if any above the normal annual rate of expansion of general business except for a few months in the last half of the year.

"The automobile and building industries have continued to be the leading factors in the business movement; the extraordinary expansion of stock exchange activity during the year, as in preceding years since 1923, stands in strong contrast to the general growth of industry and trade.

"Current momentum will probably sustain general business activity at a fairly high level through the first quarter of 1929."

That, in substance, is a collective interpretation of business statistics, gathered by statisticians and economists of organizations and corporations representing about 30 of the leading industries of the country and formulated at the first monthly meeting of "the Conference of Statisticians in Industry," a new organization operating under the auspices of and with the cooperation of the National Industrial Conference Board, New York.

Germany Puts Non-Ferrous Semi-Finished on Free List

HAMBURG, GERMANY, Dec. 11.—Effective Feb. 1, the present duty on all non-ferrous metal scrap and on non-ferrous semi-finished material will be cancelled and these materials placed on the free list. Germany is a large buyer of brass, bronze and copper semi-finished products in the United States, and it is expected that elimination of the duty will serve to increase this business.

Foundry Equipment Orders Show Gain

The index of gross orders taken by 20 members of the Foundry Equipment Manufacturers Association was 197.8 in November, compared with 185 in October and 170 in September. Net orders (after deducting cancellations) stood at 195.2. The November index of shipments was 264, against 254.3 in October and 129.7 in September. The index of unfilled orders on Nov. 30 was 403.9, compared with 462.6 one month previous and 529.5 on Sept. 30. The base for the indexes is the average of monthly shipments for 1922, 1923 and 1924, taken as 100.

Welded Chain Simplification

WASHINGTON, Dec. 24.—The Division of Simplified Practice, Department of Commerce, has sent copies of the proposed simplified practice recommendation for welded chain to manufacturers, distributers and users for acceptance. When the recommendation has been accepted by the industry as a whole it will become effective for new production on Feb. 1, 1929.

The value of files produced in 1927 by the 36 reporting establishments was $12,973,734, a decrease of 4.2 per cent under $13,540,953 reported by 38 establishments for 1925.

Price Declines in European Markets

Germany and Belgium Face Falling Values—Better Shipbuilding Orders in Britain Expected to Stimulate Trade

(*By Cablegram*)

LONDON, ENGLAND, Dec. 24.

IRON and steel markets are quiet on the eve of the holidays, but the outlook is regarded as slightly more favorable, in view of the increase in shipbuilding orders placed in recent weeks. Northeast Coast producers are preparing to relight additional furnaces, as current Cleveland output is being absorbed by local consumers.

Thomas W. Ward, Ltd., Sheffield, has purchased the Low Moor Iron Works from the receiver, and will continue the business after reorganization and rearrangement of the plant.

John I. Thornycroft & Co., Southampton, have been awarded contract from the Canadian Government for two destroyers, costing about £670,000 ($3,250,000) for the two, and calling for delivery in the spring of 1931.

Heavy steel makers are looking for better times, but export business still is difficult. Foreign ore markets are idle.

Tin plate markets are quiet but the makers will begin the new year with well-filled order books, on the restricted output arrangement, for several months. Some are heavily committed up to June. Indications point to increase in world demand and the prospects for the tin plate trade are quite bright.

Galvanized sheets are quieter, but most mills are well placed over January and prices are firm. Black sheets are dull.

On the Continent of Europe

Continental markets are quiet and prices are weakening, on absence of buying. The works are reported as in need of orders.

Germany Foresees Price Decline

Lockout Believed to Have Retarded But Not Stopped Lower Export Prices—More Scrap Used in Steel

BERLIN, GERMANY, Dec. 12.—The outlook in export trade is rather uncertain. Despite the lockout, German mills report few cancellations of export orders and are resuming operations as rapidly as possible. An early decline in export prices is expected as a result of resumption of steel production here. As the export prices of bars registered a slight decline in November, during the period of the lockout, it is concluded by German observers that a price decline in international markets was due, prior to the lockout, and that suspension of German production merely retarded a definite downward movement.

When the present shortage of material in the domestic market is satisfied, there are indications that home trade in iron and steel will begin to slacken. The volume of bank credits to business have declined sharply. The import surplus of Germany has decreased recently, but this is largely the result of pressure for export orders to offset the decline in domestic business.

Export of machinery is considered satisfactory and in the first nine months of this year shipments of machinery to foreign markets reached a total value of 773,675,000 m. ($184,135,000), compared with 612,300,000 m. ($145,727,000) in the first nine months of 1927. The price per unit of weight of machinery exported this year has been 78 per cent greater than in 1913.

No agreement has been reached between the European Rail Makers' Association and Great Britain on exports of rails. The disagreement is on the proper handling by the association of excess British deliveries to British colonies. The excess since formation of the association has been 120,000 tons. The association favors suspension of rail deliveries until this excess has been eliminated, while Britain urges settlement by monetary compensation. No agreement as to

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British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at $4.85 per £ as follows:

Durham coke, del'd	£0	17½s.				$4.24			
Bilbao Rubio ore*	1	2	to £1	2½s.		5.34	to	$5.46	
Cleveland No. 1 foundry	3	8½	to 3	9½		16.61	to	16.85	
Cleveland No. 3 foundry	3	6				16.00			
Cleveland No. 4 foundry	3	5				15.76			
Cleveland No. 4 forge	3	4½				15.64			
Cleveland basic (nom.)	3	5				15.76			
East Coast mixed	3	11				17.22			
East Coast hematite	3	11½				17.34			
Rails, 60 lb. and up	7	15	to 8	5		37.59	to	40.01	
Billets	6	5	to 6	10		30.31	to	31.53	
Ferromanganese	13	15				66.69			
Ferromanganese (export)	14	0				67.90			
Sheet and tin plate bars, Welsh	6	0				29.10			
Tin plate, base box	0	18	to 0	18⅛		4.37	to	4.39	
Black sheets, Japanese specifications	13	7½				64.87			
						C. per Lb.			
Ship plates	7	12½	to 8	2½		1.66	to	1.76	
Boiler plates	9	0	to 10	10		1.95	to	2.27	
Tees	8	2½	to 8	12½		1.76	to	1.86	
Channels	7	7½	to 7	17½		1.60	to	1.71	
Beams	7	2½	to 7	12½		1.55	to	1.65	
Round bars, ¾ to 3 in.	7	10	to 8	0		1.63	to	1.73	
Steel hoops	9	0	to 10	0		1.95	to	2.16	
Black sheets, 24 gage	10	0				2.16			
Galv. sheets, 24 gage	13	10	to 13	15		2.93	to	2.98	
Cold rolled steel strip, 20 gage (nom.)	16	0				3.47			

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):								
Belgium	£3	3½s.	to £3	6s.	$15.39	to	$16.00	
France	3	3½	to 3	6	15.39	to	16.00	
Luxemburg	3	3½	to 3	6	15.39	to	16.00	
Basic pig iron (a):								
Belgium	3	4½	to 3	5½	15.64	to	15.88	
France	3	4½	to 3	5½	15.64	to	15.88	
Luxemburg	3	4½	to 3	5½	15.64	to	15.88	
Coke	0	18			4.37			
Billets:								
Belgium	5	1			24.49			
France	5	1			24.49			
Merchant bars:					C. per Lb.			
Belgium	6	1			1.33			
France	6	1			1.33			
Luxemburg	6	1			1.33			
Joists (beams):								
Belgium	5	3			1.13			
France	5	3			1.13			
Luxemburg	5	3			1.13			
Angles:								
Belgium	6	1½			1.32			
⅛-in. plate:								
Belgium (a)	6	11			1.44			
Germany (a)	6	11			1.44			
⅜-in. ship plate:								
Belgium	6	7			1.38			
Luxemburg	6	7			1.38			
Sheets, heavy:								
Belgium	6	1			1.31			
Germany	6	1			1.31			

(a) Nominal.

the amount of compensation has been reached.

Shipbuilding conditions are unsatisfactory. A strike involving about 45,000 shipyard workers has been in progress for more than two months and has caused some distress among shipbuilders. The Schiffswerke und Maschinenfabrik A. G., Hamburg, has suspended payments to its creditors, and the Vulcan company, the largest shipyard at Stettin, has been dismantled. The Tecklenborg shipyard in Bremerhafen and the Frerichs yard in Einswarden have been closed. The Schickau yard at Elbing, which formerly built battleships on a large scale, has suffered serious financial losses. Shipbuilding orders have declined to about 500,000 tons, while the capacity of German yards is about 900,000 tons.

A recent governmental survey of raw materials used by the iron and steel industry has reported that of 21,980,000 tons of ore and scrap used in 1913 in the territory of pre-war Germany, 15,330,000 tons was consumed in the present area of Germany. In 1926 consumption totaled 19,680,000 tons. In 1913, 73 per cent of the material was ore and 27 per cent scrap. In 1926, 59 per cent was ore and 41 per cent scrap.

Spot Export Prices Higher

German Mills Secure Premiums for Early Shipment But Grant Concessions for Next Year—Some Rod Inquiry

BREMEN, GERMANY, Dec. 11.—The rather unexpected end of the lockout at German steel mills has brought a flood of orders from European export buyers, but the Stahlwerksverband has informed the exporters that at present no export tonnages can be accepted as the extensive demand from the German heavy hardware industry must be satisfied first. Until about Dec. 19, no steel can be accepted for export, except medium gages and sizes of plates and tubes, available from mills in Upper Silesia and Saxony.

The current export market on steel is somewhat unusual, as concessions are obtainable on January-February shipments, while premiums are being offered for immediate delivery. The nominal price of steel bars is £6 4s. ($30.13) per metric ton, f.o.b. Antwerp, but for shipment within three weeks as much as £6 8s. 6d. ($31.23) per ton, Antwerp, has been paid. The usual quotation for 3/16-in. and 1/4-in. rounds is £7 7s. 6d. ($35.84) per ton, Antwerp, but for early shipment offers of premiums have brought this price to as much as £7 15s. ($37.67) per ton. About 580 tons of angles and tees, nominally worth £5 17s. 6d. ($28.55) per ton, brought a price of £6 7s. 9d. ($31.04) per ton, f.o.b. Antwerp, shipment being guaranteed on a steamer from Antwerp Dec. 19. These premiums are being secured by mills in the Saar, Czechoslovakia and Luxemburg.

Recently Japan has been actively inquiring for wire rods and about 15,000 tons of such business is pending at present. Otherwise Japanese merchants and importers have been unusually quiet in the past month. Most exporters have refrained from quoting on the wire rod inquiries as the available supply is apparently limited. Although the quotation is nominally £6 2s. 6d. ($29.77) per ton, quotations to Japan for February shipment have been £6 7s. 6d. ($30.98) per ton and as much as £6 10s. ($31.59) per ton was asked for January shipment. As Japanese buyers are apparently not inclined to pay such prices, it is believed in some quarters that some of this business may go to American or Canadian mills.

Business with Japan in light gage sheets has continued moderately active throughout the lockout as the sheet mills rolling these light gages were not affected. Recently quotations on these sheets have been advanced to a range of $75.50 to $76 per ton, c.i.f. Japanese port, and concessions from this level are reported unusual.

International Steel Cartel Quota Unchanged

WASHINGTON, Dec. 24.—By a decision of the central directing committee of the International Steel Cartel, meeting in Paris on Dec. 13, the cartel will continue to operate over the first quarter of 1929 with the same production quota as in each quarter of the present year, 7,321,750 metric tons or 29,287,000 tons per year, according to a cablegram received by the Department of Commerce from the commercial attaché in Paris.

Luxemburg Looks for Export Trade

LUXEMBURG, Dec. 10.—The iron and steel markets continue quite firm, termination of the German lockout having had no appreciable effect on business. Despite Germany's return as a competitor for steel business, the loss of production through the lockout will probably be a factor for some time.

Export trade is only of moderate proportions at present, but more settled conditions in China are expected to bring a revival of merchant buying in that country. Exporters here doubt that the Japanese Government will make any further increase in the tariff on iron and steel, although the Japanese steel producers are still urging higher duties. A similar demand for increase of the steel tariff is under consideration in Canada.

On Nov. 1 there were 38 Luxemburg blast furnaces operating of a total of 47 in existence. October production totaled 236,429 metric tons of pig iron and 228,973 tons of steel ingots.

Imported Steel Prices Lower —Export Trade Quiet

NEW YORK, Dec. 24.—Continental steel prices have registered a further decline, so that quotations on shapes to importers in New York range from 1.75c. to 1.80c. per lb., duty paid. Consumers are only moderately interested at present, even though current prices represent a saving of several dollars a ton to the buyer. Prices of steel bars from European mills continue high and importers are unable to quote less than about 2c. per lb., duty paid, Atlantic port. Several hundred tons of steel piling for Port Arthur, Tex., is reported to have been awarded by the Texas Co. to the German manufacturer of piling.

Export business continues small, except for some buying by Chinese merchants handling plate cuttings and bar crops. Inquiry from Japan is confined to small lots of special material and some tin plate. The quarterly tin plate requirements of the Nippon Oil Co. are understood to have been awarded, a total of 35,000 base boxes of oil can sizes being placed.

Japan's Steel Production Put at 2,000,000 Tons

WASHINGTON, Dec. 25.—Japanese production of steel in 1928 is estimated at about 2,000,000 tons, according to a cablegram received from Commercial Attaché Halleck A. Butts, Tokyo, by the Iron and Steel Division, Department of Commerce.

Luxemburg Production Large

WASHINGTON, Dec. 24.—The record activity of the Luxemburg iron and steel industry in 1927 will be exceeded, or at least maintained, during 1928, according to reports received from Vice Consul James E. Parks, Luxemburg, on output for the first 10 months of the present year. The production of pig iron totaled 2,279,000 metric tons in contrast to 2,723,356 tons for the 12 months of 1927. Raw steel production was 2,135,876 tons compared with 2,458,439 tons in 1927.

Manhattan Rubber Mfg. Co., Passaic, N. J., maker of mechanical rubber goods, has paid a bonus to all employees, amounting to 2 per cent of yearly salary.

Defective Steel May Take Billet Freight Rate

WASHINGTON, Dec. 24.—Billet rates will be applied on a large number of defective steel products such as damaged sheets and plates throughout various points in Official Classification territory if the Interstate Commerce Commission approves a proposed report by Examiner E. H. Kerwin, made public last Wednesday. At present a number of products now take the fifth class rate or special iron and steel rates. The case was a consolidation of numerous complaints that had been filed against existing railroad tariffs. The protest..nts included both consumers and producers, and the proceeding was known as that of the Wrought Washer Mfg. Co. vs. the Pere Marquette Railway Co., et al. The report represents a complete or partial victory for the complainants, who had asked for either billet, scrap or "reasonable" rates. The examiner further held that proposed changes in descriptions of and rates on waster sheets and plates were not justified and that if new tariffs are filed they must conform to the description he gave of these products.

More Workers and Larger Payrolls in Illinois

Employment in Illinois gained ½ per cent during November, according to Sidney W. Wilcox, chief of the bureau of labor statistics, Illinois Department of Labor. This gain, with others made earlier in the year, placed the rate of employment in Illinois factories at 4.6 per cent above that of November, 1927. The total payroll for November was 1.4 per cent greater than in October, the increase in wages being nearly three times the gain in employment. The impetus in employment has come largely from farm implement manufacturers, makers of machinery, and producers of electrical appliances. Iron foundries have supported the upward movement with a pick-up of 1.5 per cent.

Steel Castings Orders Ahead of Last Year

WASHINGTON, Dec. 24.—Orders for commercial steel castings in November totaled 84,304 net tons, or 59 per cent of the monthly capacity of the 129 concerns reporting to the Department of Commerce. This compares with bookings of 78,082 tons in October, representing 54 per cent of capacity. Production in November was 81,913 tons, or 57 per cent of capacity, against 87,058 tons, or 60 per cent of capacity, in October. In November, 1927, production was 59,008 tons and orders 62,694 tons.

Of the November orders, 34,526 tons was for railroad specialties, being 51 per cent of this class of capacity, while 49,778 tons was miscellaneous castings, being 65 per cent of such capacity.

For the 11 months ended November, 1928, total orders were 899,174 tons, against 841,756 tons for the corresponding period of 1927, the gain coming mainly from the miscellaneous class. Castings for railroad use aggregated 345,809 tons against 344,-991 tons for the corresponding 11 months of 1927, while miscellaneous bookings were 553,365 tons and 496,-765 tons respectively.

Production for the 11 months of 1928 totaled 934,911 tons, compared with 906,394 tons for the 1927 period. Of the 1928 output, 344,862 tons was for railroad specialties, against 351,-296 tons for the corresponding period of 1927, and the output of miscellaneous castings was 590,049 tons and 555,098 tons respectively.

45 Government Ships Sold for Scrap

WASHINGTON, Dec. 24.—It is estimated that approximately 76,500 tons of steel scrap is contained in 45 vessels averaging 5000 deadweight tons each which the Shipping Board has sold to the Union Shipbuilding Co., Baltimore, with the understanding that the ships will be completely scrapped and dismantled within 18 months. The steel is divided about as follows: Plates, 57,375 tons; shapes, 15,300 tons and bars, 3825 tons. The sale price of the ships was $423,600. The vessels are laid up as follows: James River, 23; New York, five; Philadelphia, two; Mobile, Ala., two; New Orleans, five; Orange, Tex., eight. The Shipping Board now has less than 450 vessels in its laid-up fleets.

Foundrymen's Apprentice Contests for 1929

The apprentice contests that have been held in connection with recent conventions of the American Foundrymen's Association, will be continued as an annual feature, and regulations are ready for distribution to those plants planning to have their apprentices take part.

The contests for 1929 will be held in three divisions—gray iron molding, steel molding and pattern making. Three prizes will be given in each division. The first prizes will consist of wrist watches valued at $50; the second prizes will be cash awards of $25, and the third prizes will be cash awards of $10. Each apprentice receiving a prize will also be given an engraved certificate.

Local contests to determine the castings and patterns to be submitted in the national contest can be held either by individual plants, local foundrymen's associations, or similar organizations conducting their contests to conform to the rules and regulations laid down by the A.F.A. apprentice contest committee. Local contests must be held in time to have their entries in the national contest reach the Chicago convention by April 2. Copies of the regulations may be had upon application to the secretary of the A.F.A.

These contests, beginning with the Milwaukee convention in 1924 with only Milwaukee firms participating, have grown in extent until, at the 1928 Convention, 20 plants from six foundry centers had apprentice work entered in the national contest and many more had taken part in the local contests.

Mexican Steel Industry Making Progress

Considerable progress is being made by the steel industry in Mexico. There are two fairly large companies: the Monterey Iron & Steel Works, Monterey, and the Consolidated Rolling Mill & Foundry Co., S. A., Mexico City.

The Monterey company has recently changed its open-hearth furnaces to burn gas from producers instead of fuel oil. The company makes its own silica brick and produces ferromanganese, and also makes all the alloy rods and balls consumed by Mexican mines for grinding ores. The consumption of rods and balls for these purposes is said to be large.

The Consolidatel Rolling Mill & Foundry Co. has just completed the installation of a rod mill, which is claimed to be the only one south of the Rio Grande. The company purchased the entire outfit for the mill from the Black Wire & Steel Co., Kansas City, Mo. The capacity is 6 tons of No. 5 rods an hour.

The mill is considered in Mexico as being a decided departure from the original merchant mill usually found in Latin-American countries. The company is also making manganese steel with considerable success, according to a statement by Harry Wright, president of the company, who also says that better results are being obtained from tool steels made by his company for its bolt and nut department than were ever secured from similar steels purchased from foreign countries. The company has installed a department for making automobile bumpers from silicon alloy spring steel.

Large Output of Copper in Canada

WASHINGTON, Dec. 22. — Copper ranks second among metals in Canada in value of production. Output in 1927 was 140,141,823 lb., or a little over 4 per cent of the world's total, according to a report from Consul H. T. Goodier, Vancouver, B. C., made public by the Department of Commerce. Production in 1923 was 86,881,537 lb. The output of British Columbia copper mines in 1927 was 91,685,843 lb., or 64 per cent of the Canadian total.

Low Profits a Challenge to Steel Industry

G. H. Charls, President Flat Rolled Steel Manufacturers, Says Ignorance or Wilful Disregard of Costs and Straining for Tonnage Cause Inadequate Returns

"HOW long will the iron and steel industry permit its earning power to remain little better than the return on a safe Government bond?" asked G. H. Charls, president National Association of Flat Rolled Steel Manufacturers, in a recent address to the Malleable Iron Research Institute at Cleveland. "When will the steel industry," he went on, "recognize and regulate the causes behind the effect? Is not this a challenge to the ingenuity, sales instinct and will-to-do of all steel producers?

"It is one thing," he said, "to know the causes that keep an industry from being prosperous; it is quite another thing to influence the membership of an industry to evolve a plan and make it work to rectify the situation.

"There is no short cut to stabilization of an industry. Facts and the causes of unsatisfactory conditions must be squarely faced, recognized and understood. Then unfalteringly the units of that industry must seriously unite and unremittingly cooperate to obtain a true knowledge of what is ethical and unethical, economical and uneconomical, and persistently strive for the attainment of the one and the elimination of the other. This is possible only through group action. The isolationist is a pre-war product.

Ignorance of Costs a Cause of Inadequate Profits

"The most pernicious cause of inadequate returns on invested capital in an industry, and the one which has been and should be emphasized, criticised and condemned most sharply, is an ignorance of the cost of doing business, or the wilful disregard of such cost as is known when a commodity is priced.

"Clearly allied with this prime cause is the absence of market research and analysis to measure demand, together with a blind, unthoughtful attitude which blocks the way to group effort to expand such demand.

"Abram F. Myers, chairman Federal Trade Commission, has said:

> The proper pricing of products is naturally the first concern of the business man and one on which he needs all the information and help he can get.
>
> It is a serious mistake for the individual or an industry to permit competition to price its products without any regard for the cost of producing such products.

"In these quandaries, the strong must guide and help the weak, or be crippled and perhaps destroyed by their unintelligence and misbehavior. The strong must assume leadership, for only the strong can influence and dominate by precept and example and lead an industrial group out of the slough of jungle competition into the knowledge of the fundamental requirements of modern business principles.

"It must ever be kept in mind that a trade association is only a means to an end; that without the active participation of its members, their enthusiastic support, thought and effort, the association will become a joke.

"On the other hand, when the members become conscious of the necessity and the possibilities of group action and apply their intelligence vigorously to the problems of the industry, a trade association becomes the finest—in fact, the only—possible means of self regulation in industry—the fourth leg of the chair upon which an industry rests.

Government Attempting Help and Cooperation

"The Government is attempting to cooperate and to be helpful as never before. There is a momentous reversal of attitude on the part of the Federal Trade Commission toward association work. During the past year many successful trade practice conferences have been held.

"From our perusal and analysis of the decisions handed down in the Trade Practice Conferences with the millwork industry, hickory hand woodturning industry, cottonseed oil industry and the flat glass industry, it seems obvious that a very constructive piece of work is being done. If these decisions are successfully sustained by law, they will constitute a new Magna Charta to industry throughout America.

"Insofar as we are able to determine from the regular and irregular sources of statistics, the answer to the question, 'How is business?' is: 'Good for the present and the first quarter.'

"If this question was 'How are profits?' the answer would probably be that the iron and steel industry has been so irritated by auburn figures—5 per cent return may be termed 'auburn'—that it is beginning to shy like a colt when it sees a redheaded girl.

"May I call attention to a chart issued by the National Industrial Conference Board, for it tells a wonderful story of sales achievement.

"Note the automotive industry, operating at the rate of 68.8 per cent of capacity in 1926; 70.3 per cent of capacity in 1927; earning at the rate of 22 to 30 per cent. Then note the steel industry, operating at the rate of 75.1 per cent in 1926; 68.8 per cent in 1927; earning 4½ to 5½ per cent on its invested capital.

"The question arises, 'What ought to be the profits in an average industry in normal periods of prosperity?' It is estimated that the average profit of all industries in the United States is 10 per cent.

Says Urge for Tonnage Destroys Steel Industry's Profits

"Is it any more than simple intelligence to aspire to such an ideal, such a vision of what so decidedly ought to be? Of course it is not, and yet otherwise intelligent executives seem astonishingly unaware of the ridiculous and really tragic attitude they manifest in the conduct of their business. In their madness and frenzy, they proceed to pull down the supporting pillar of the temple of prosperity, mumbling 'tonnage, tonnage, tonnage.'

"Apparently possessed, they pursue the shadow of capacity operation and crucify the substance of a sane, average profit on the cross of unintelligent, unreasonable, destructive competition. All ethical and economical thoughts and ideas are thrown to the four winds. They seem to think that business is simply a warfare to eliminate competitors and to establish the survival of the fittest. They are living in the atmosphere of the jungle.

Assails "Ruthless Price Cutters"

"To conduct a profitable business in an industry, it is necessary for the industry to be manned by executives actuated by something loftier than the code of animals—not by ruthless price cutters who ridicule and deny a place to finer ethics and to collective economical judgment.

"The iron and steel industry must come to a fuller realization that only that industry will successfully prevail which resolves to correlate its effort in recognition of the principle that, 'The prosperity of the whole is the individual's greatest opportunity for progress.'"

The Tennesse Coal, Iron & Railroad Co., Birmingham, will install a Rust triple fired recuperative continuous furnace at its Fairfield Works. The furnace will have a capacity of 30 tons per hour of blooms or beam blanks.

Youngstown Assured Access to Waterways

Most Economical Use of All Forms of Transportation Called a Public Necessity—Shipper Ownership of Railroads Opposed

WASHINGTON, Dec. 24. — Long-sought access to river transportation seems assured to the Youngstown district. It is held to be of vital importance to the iron and steel industry of that section as a means of reducing freight costs on inbound raw material, such as coal and limestone, and on outbound manufactured products to the Southern and Southwestern markets. It is maintained that the district will thus be placed in a better competitive relationship with Pittsburgh and other surrounding districts that now enjoy water transportation. Iron and steel makers in the Youngstown district have contended that they have been forced to third place in steel output, being succeeded in second place by the Chicago district, and have assigned as the reason the high freight rates on inbound raw materials, especially coal from the Pittsburgh and Connellsville districts, and also on outgoing manufactured products.

The precise manner in which river transportation for the Youngstown district will be provided cannot be determined until the Interstate Commerce Commission passes finally upon the application of the Pittsburgh, Lisbon & Western Railroad for authority to construct two branches from its present line, one extending northward to Youngstown and the other southward to Smith's Ferry, Pa., on the Ohio River, the two branches, together with a short section of the existing line, forming a north and south line from the Ohio River to the Youngstown district. In its decision last week the commission specifically said that "public convenience and necessity . . . require the provision of rail transportation between the Ohio River and the Youngstown district in connection with the transportation on the Ohio River and connecting waterways." At the same time the commission held the case open and assigned further hearing for the purpose of securing evidence bearing upon the practicability of providing such rail transportation over existing lines.

The commission thus actually, in effect, ordered connection of the Youngstown district with the Ohio River, though it did not grant the Lisbon application. Rather, it has left it to the existing trunk lines, the Pennsylvania and the Pittsburgh & Lake Erie, to determine whether they will make the necessary connection. The Pennsylvania and Pittsburgh & Lake Erie already have land available, the former at Beaver, Pa., and the latter at Monaca, Pa., for the construction and operation of facilities for the transfer of freight between barges and cars, which would afford rail-water-and-rail connection with the Youngstown district. At present coal carried over these lines to the Youngstown district from the Pittsburgh and Connellsville district is transported all-rail, the rate from the Pittsburgh district being $1.34 per ton while the rate from the Connellsville district is $1.43 per ton. The Lisbon railroad estimated that the average rate by use of its new lines would be about 60c. The Youngstown district consumes about 8,000,000 tons of coal annually from the two western Pennsylvania districts and the saving in the freight bill through such a reduced rate is readily seen. Limestone also would come into the Youngstown district from Ohio quarries over a rail-water-rail route.

It remains to be seen what the attitude of the trunk carriers will be or what step may be taken by the Lisbon railroad, owned and controlled by the Pittsburgh Coal Co., before the case is finally determined, or whether the new construction will be permitted. The commission said, however, that "the existence of low-grade lines operated by strong systems (the two trunk lines) between the mouth of the Beaver River and the Youngstown district suggests strongly that these lines should be used in preference to the construction and operation of an expensive new line. The utility of the proposed new line in the transportation of local traffic or in the development of the industrial territory at Youngstown would be relatively unimportant.

Commission Opposes Shipper Ownership of Railroad

The opinion prevails that the commission will not grant the Lisbon a certificate, provided the trunk lines establish the required water connection with the Youngstown district and grant reasonable rates on coal. Steel producers in the Youngstown district strongly supported the Lisbon application. The Youngstown Sheet & Tube Co. proposed to provide facilties at Smith's Ferry for unloading and loading purposes. The commission, however, said that the control of a common carrier by its principal shipper is to be avoided, thus implying that it would separate the Lisbon from control by the Pittsburgh Coal Co. It also declared it would consider, if further investigation were necessary, the matter of imposing a further condition that terminal facilities be provided on the Ohio River that are not under any industry or industries.

The apparent plan to separate a carrier from industrial control created considerable comment, and speculation went so far as to say that it indicated a policy of the commission that might affect industrial carriers and their owners throughout the country. Many industrial carriers and their ownership, notably the steel lines and the owning industries, have been the object of exhaustive investigations in the past. In the bulk of the cases, however, these "tap" lines were held to be common carriers, open to all traffic and not merely to that of the owning industries. Neither those cases nor the Lisbon case could come under the commodities clause of the act to regulate commerce because that clause prevents ownership by a railroad of an industry whose products it hauls and does not bear upon ownership by an industry of a railroad, though there has been some legal discussion as to the difference in effect.

Development of Waterways Favored

The commission decision in the Lisbon case was also taken to indicate growing determination to develop the waterways for transportation purposes as directed by Congress.

"The evidence shows that it is practicable and desirable that the Youngstown district should have access to the Ohio River by rail line or lines which will afford them substantially the transportation advantages, including rates, proposed by the applicants (Lisbon and Montour railroads) in this case," said the commission. "The advantages of the utilization of the Ohio and its connecting waterways have been amply demonstrated and the rail carriers should realize that they cannot continue to handle by all-rail routes much traffic which can be more economically transported by all-water or rail-and-water routes. The interveners express the fear that lower rates over a rail-and-water route will jeopardize the present rate structure, but, assuming such fear to be well founded, that fact would not justify us in withholding approval of any plant which promises to reduce substantially the cost of necessary transportation. It is also clear of record that the construction of the proposed new line would result in unnecessary duplication of facilities, if it is possible to make advantageous use of the existing lines of the Pennsylvania and the Pittsburgh & Lake Erie. The use of these lines between the Ohio River and the Youngstown district at reasonable rates would reduce the losses which the interveners apprehend through the diversion of their

traffic to the rail-and-water route proposed by the applicants."

At another point the commission said that public convenience and necessity, in the broader sense, require the combined use of all the agencies that can contribute to adequate and efficient transportation at the lowest cost. From the great and increasing use of the waterways of the Ohio River system, it was declared, it is clear that their development has been justified. It is also apparent, the commission added, that these agencies, which have been practically created by the Government, should as speedily as possible be made available to the public generally, through the establishment of common carrier service.

Youngstown Costs Have Risen

The commission briefly sketched changes in the iron and steel industry and rate adjustments over a period of years that had brought about a change in the competitive situation as between the Pittsburgh and Youngstown districts. Changes in rate adjustments and, apparently to a still greater extent, changes in the methods of manufacture of coke, it was stated, have impaired the ability of the Youngstown manufacturers to market their products in competition with their rivals. Another important advantage of the Pittsburgh manufacturers, developed in recent years, is their ability to utilize the improved water transportation facilities on the Monongahela and Ohio rivers for transporting coal from mine to mill, as well as for moving their products in reaching territory to the south and southwest, said the commission. Replacing of beehive coke with by-product coke, it was pointed out, enabled manufacturers to dispense with rail transportation for coke, but the Pittsburgh manufacturers were declared to have gained the greater advantage by reason of the fact that they were able to move coking coal by barge. Coke, it was stated, does not lend itself to movement by water.

"To show the general effect of these changing conditions," said the decision, "it was testified that the transportation costs of assembling material for the manufacture of one ton of pig iron at Youngstown in 1913 amounted to $2.37 and at Pittsburgh $2.63. In 1918, with the use of by-product coke instead of beehive coke, these comparative figures had changed to $3.28 for Youngstown and $2.49 for Pittsburgh; and in 1928 they became $4.44 and $3.11 respectively."

British Machinery Makers May Oppose Steel Tariff

WASHINGTON, Dec. 24. — British makers of machinery and other engineering products, desirous of obtaining raw materials at the lowest possible prices to maintain their volume of exports in highly competitive markets, are expected to offer stiff resistance to the imposition of a tariff on imports of iron and steel products, according to a report received from Vice-Consul Wallace E. Moessener, Manchester, England. During the past year or more, the report stated, there has been considerable agitation in favor of imposing a tariff on iron and steel imports since foreign manufacturers in continental and other countries are able to undersell British manufacturers in the latter's home market. Reports that an import duty on machine tools may also be sought are heard from time to time, it was declared, but it does not appear that British tool makers will be able to obtain sufficient support to put such a duty in effect.

The report said that the United States is the principal supplier of British imports of air compressors, pneumatic tools, pumps, mining coal cutters, packing machinery, conveyors, cranes and hoists; machinery for grain milling, boot and shoemaking machinery, and glass working, woodworking, weighing papermaking and miscellaneous machinery. The United States occupies second place in supplying filter presses and ball and roller bearings. Germany leads in supplying hydraulic machinery and filter presses. Raw materials come principally from Belgium.

Enameled Metal to Be Considered

American Ceramic Society will meet Feb. 4 to 7 at the Stevens Hotel, Chicago. The latter three days will be devoted to divisional meetings wherein four symposiums and 95 papers are to be presented. Important groups of contributions relate to enameled cast iron products and to brick manufacture and testing.

By-Product Coke Output at Record Daily Rate

WASHINGTON, Dec. 20.—Amounting to 137,405 net tons, the daily rate of by-product coke production during the 30 days of November was the highest in the history of the industry, according to the Bureau of Mines. It showed a gain of 1 per cent over the daily rate of 136,105 tons for the 31 days of October. The total October output, however, exceeded that of November, having been 4,219,262 tons, against 4,122,150 tons in November.

Eighty-two plants active in November produced 88 per cent of their capacity. Total output of beehive coke in November was 416,000 tons, equivalent to a daily rate of 16,000 tons, compared with 15,593 tons in October. Production of all coke in November was 4,538,150 tons, of which 90.8 per cent was made in by-product ovens.

Quoting THE IRON AGE, the bureau pointed out that "pig iron production in November was 3,302,523 gross tons, a daily rate of 110,084 tons, the highest since early 1926. The November production of pig iron was the highest for that month in any year since 1918."

Total coke was 1.374 net tons for each gross ton of pig iron in November, against 1.375 in October and 1.465 in November, 1927.

Institute of Metals Changes Date of Meeting

The council of the (British) Institute of Metals has found it necessary to change the date of the twenty-first annual general meeting and its "coming-of-age" celebrations from that originally announced, March 6 and 7, to March 13 and 14, 1929.

Following the sessions on March 13 there will be a dinner and dance at the Trocadero, and the next day will be featured by a conversazione and exhibition in the Science Museum, South Kensington. Objects of special interest in relation to the work of the institute will be displayed.

The annual May lecture of the institute is to be given on May 7 by Sir Oliver Lodge.

The annual autumn meeting will be held in Düsseldorf, Germany, next September. Offers of papers for that meeting are invited by the council, which, it is understood, will particularly welcome papers dealing with matters of practical interest. It is proposed also to hold at Düsseldorf a general discussion on laboratory methods in metallurgical research, in which speakers from many countries are expected to participate.

Applications for membership are now being submitted so freely, it is stated, that it is expected the total will reach the 2000 mark before Dec. 31.

Wholesale Prices Are Lower

November average prices of commodities, as reported by the United States Bureau of Labor Statistics, have an index of 96.7, compared with 97.8 in October. The November figure is identical with that of a year earlier. Reductions have occurred in six of the ten general groups. Textile products show no change, while there were slight advances in metals and metal products, building materials and chemicals and drugs.

Metals have reached 101.7, compared with 101 in October, because of increases both in the iron and steel classification, which went up from 95.1 to 96.1, and in the non-ferrous group, which advanced from 95.8 in October to 97.9 in November. There was no change in the three other subgroups under metals—agricultural implements, automobiles and other metal products.

A voluntary petition in bankruptcy has been filed by the Standard Crucible Steel Casting Co., 717 Thirtieth Street, Milwaukee. Schedules reveal liabilities of $36,962, and assets of $46,304 are claimed.

Program for Foundrymen's Convention

New Features Provided for Meeting at Chicago—Exhibit and Technical Sessions to Be Under One Roof

A DIVERSIFIED program has been arranged for the convention and exhibit of the American Foundrymen's Association, to be held at Chicago, April 8 to 11, 1929. All activities of the week—registration, technical sessions, dinners, banquets and exhibits—will be in the new Hotel Stevens, Chicago. All technical meetings will be on the third floor, with ample accommodations for simultaneous sessions. Registration headquarters and exhibits will be on the basement level, one flight down from the main lobby. All this will make it possible for members and guests to attend the meetings and inspect the exhibits without loss of time and the inconvenience always present when activities are scattered.

While exhibits will be limited as to space occupied, they will be as interesting as ever in character, with practically all regular exhibitors participating. The program as planned will be so full as to provide but little opportunity for general entertainment for the men, but the usual entertainment for ladies will be arranged for.

For Monday evening the annual exhibitors' dinner is scheduled. On Tuesday evening there will be a general session on foundry sands, preceded by a special dinner on the third floor. On Wednesday evening the annual banquet will be held, the social event of the convention. The usual provisions for plant visitation will be made under the auspices of committees of Chicago foundrymen. The tentative schedule for the convention program is as follows:

Monday, April 8

10 a. m. Registration.
Opening of exhibits.
2 p. m. Committee meetings.
4 p. m. Cast iron and steel founding shop operation courses.

Tuesday, April 9

10 a. m. Foundry Costs.
Steel Founding.
Iron Founding.
12.30 p. m. Round Table — Non-Ferrous Cost Methods.
Round Table—Steel Founding.
4 p. m. Sand Control.
6 p. m. Dinner gathering of those interested in sand control.
7 p. m. Foundry Sands.

Wednesday, April 10

10 a. m. Non-Ferrous Founding.
Cast Iron Research.
Materials Handling.
12.30 p. m. Round Table — Non-Ferrous Shop Practice.
2 p. m. Foreman Training.
4 p. m. Cast iron and steel founding shop operation courses.

Thursday, April 11

10 a. m. Malleable Iron.
Apprentice Training.
12.30 p. m. Round Table-Malleable Founding.
2 p. m. High-Test Cast Iron.
4 p. m. Cast iron and steel founding shop operation courses.

Shop Operation Courses: The shop operation course on cupola practice, as tried out at the Philadelphia convention last May, proved to be of so much interest and value that the program committee has decided to broaden this type of meeting and conduct courses for both the gray iron foundrymen and the steel foundrymen at the coming convention. Each course will consist of four meetings and instruction in the fundamentals of shop practice will be given.

Round-Table Luncheon Meetings: Round-table meetings permitting informal discussion of shop problems have proved such a success in the malleable and non-ferrous branches that a similar meeting is being arranged for the steel foundrymen who attend the convention.

Foreman Training: Foreman training, a subject of increasing importance to foundrymen, will be given a place on the program this year. Several men prominent in foreman training have been secured to tell our members how training programs can be made worth while. Those who have consented to appear on this program are:

A. B. Pierce, director department of industrial education, National Metal Trades Association, Chicago; M. H. Mellen, superintendent of education General Electric Co., West Lynn, Mass.; A. D. Lynch, director of personnel Ohio Brass Co., Mansfield, Ohio.; W. F. Coleman, W. A. Jones Foundry & Machine Co., Chicago; L. A. Hartley, director of education National Founders' Association, Chicago.

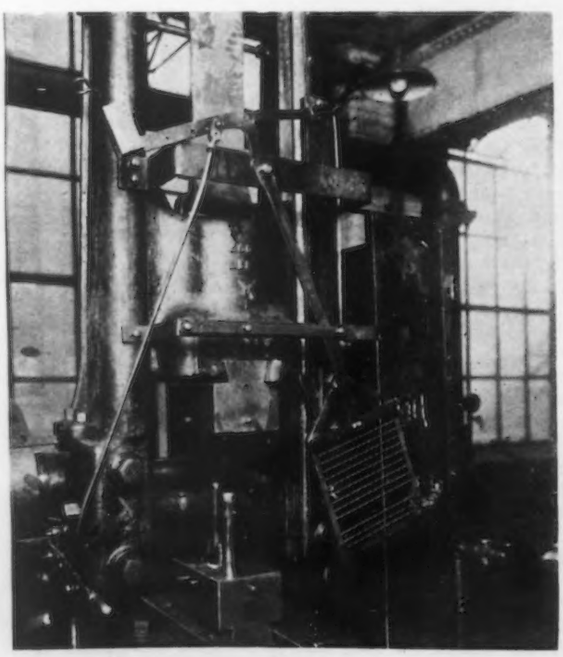
With such speakers this meeting is expected to be one of the outstanding sessions in the history of our association.

Apprentice Training: The "why" and the "how" of foundry apprentices will be brought out at the session on training foundry apprentices. J. A. Davies, general superintendent of the Philadelphia branch of the Westinghouse Electric & Mfg. Co., will explain the why and A. M. Cornell, vice-president Pettibone-Mulliken Co., Chicago, will show how training can be carried on. Other speakers will discuss further details.

Non-Ferrous Foundry Costs: As the gray iron, steel, and malleable cost methods have been given prominence at former cost sessions, the program calls for a consideration of ways and means of getting the non-ferrous foundry operators to consider the use of a uniform cost-finding method. Following the regular cost session, those interested in non-ferrous costs will get together at a luncheon meeting.

Sand Control: Breaking a precedent of many years' standing, a technical session will be held as an evening meeting. The subject to be discussed is that of sand control. The evening meeting was scheduled in order that all who are interested might attend without conflicting with their attendance at other sessions. Preceding the evening session, a meeting on sand control will be held at 4 p. m., which will be for the purpose of explaining the fundamentals of sand control and how sand control may be started in foundries.

Metallurgy and Shop Practice: The usual technical and shop practice sessions will be held covering developments in the iron, steel, malleable, and non-ferrous branches of the industry.



AMONG the numerous safety devices used on various classes of machines at the Bridgeport works of the General Electric Co. is the swinging gate guard for board or belt drop hammers, illustrated at the left. A single operating handle controls the gate guard as well as the safety dog just behind it, which prevents the large 500-lb. hammer from dropping. Thus with one motion the dog is thrown out of the way and the gate closed. The illustration shows the gate swung back to the right, with the safety dog just behind it.

This Issue in Brief

Wasted time is reduced by requiring employees to account for every minute of their time. The psychological effect of knowing that every minute is recorded is conducive to best effort, with resulting minimum costs. A simple job ticket suffices, the worker stamping it at beginning and completion of work. The ticket serves the double purpose of a progress report and cost record. — Page 1628.

* * *

Why some plants fail to avail themselves of the savings new equipment would earn. They consider only the reduction in machining cost when deciding whether to purchase a new machine, whereas time saved in subsequent assembling operations, as well as reduced repair cost, should be considered, also.—Page 1628.

* * *

In new strip mill, strip is pulled through galvanizing tanks at a constant speed by means of an automatic control. Motors are slowed down as the coils increase in diameter.—Page 1630.

* * *

Failure of coiled springs of the heavy, helical type is commonly due to overloading at the inside of the coil, metallurgist believes. He finds that stresses at the inside diameter of the springs may be 2.5 times as large as at the outer diameter.—Page 1635.

* * *

Inertia in management is responsible for neglect of opportunities for improvement in many plants. Improvements in production control, while perhaps more to be expected in the small plant than in the large, or by no means so confined. The large plant has great opportunities for improvement, in almost every instance, says journalist.—Page 1628.

* * *

Feed should be against the rotation of the cutter, not with it. Thus a tendency to dig in is avoided. This has been good practice for many years, but there is a tendency away from it of late years. —Page 1636.

Carburization is caused by diffusion of carbon soot, atom by atom, into the hot iron, entering the solid solution as austenite, according to experiments made by Japanese metallurgist.—Page 1634.

* * *

Even heating of alloy blooms is insured by soaking chamber which forms part of reheating furnace. The soaking chamber, the third of three zones of the main furnace chamber, is fired with only sufficient heat to offset radiation losses. It insures even heating and makes independent of each other the temperature conditions of the steel and the tonnage output.—Page 1632.

* * *

Work routing is simplified by giving every machine a number. Number should be carried on departmental operation sheet, as well as on time-study sheets. Machines of similar capacity should be grouped. This enables the department foreman to route work and shift work as necessity dictates.—Page 1628.

* * *

Fixtures should be designed so that the rotation of the cutter will be against the solid part of the fixture, not against the clamp. This principle is often violated, as the wrong way is usually more convenient.—Page 1636.

* * *

Spring strength is much reduced by even mild corrosion. Strength of spring steel is much higher in its quenched and tempered condition than in annealed state. But the advantage is more than lost if the metal is subject to even a mild corrosive action.—Page 1635.

* * *

To cut machining costs be sure that your fixtures may be loaded and unloaded quickly. To accomplish this, clamps which have considerable motion should, to clear the work, have a rapid action when free from the work and a slow motion with increased power when they are brought into contact with it.—Page 1637.

Shop efficiency is promoted if department foreman is furnished with a proper description of operations to be performed on any one piece. Operations, designated by number, should appear on operation card is logical sequence. Tool numbers of the fixtures and tools should be given, also.—Page 1628.

* * *

Makes automobile body scrap into toys. From 50 to 75 per cent of sheet material formerly scrapped in a Cleveland body plant is now used in making all-steel toys. As the first half of year is busy season in automobile body business and the second half in toy season, production curve has been smoothed out.—Page 1624.

* * *

Production increase is obtained by equipping open-hearth furnace with auxiliary hearth, says English steel-maker. The metal, be it scrap or hot iron, is preheated before being discharged into the main hearth.—Page 1626.

* * *

To realize the full possibilities of a cost-reducing plan, provide for a reward and encouragement to those who carry it out. For, in general, all human endeavor is directed toward the reward it brings. —Page 1628.

* * *

Condemns "jungle ethics" of price cutters. "They (price cutters in the steel industry) pursue the shadow of capacity operation and crucify the substance of a sane, average profit on the cross of unintelligent . . . competition," says association head.—Page 1649.

* * *

Sheet steel prices may be expected to be sufficiently reduced to make possible the use of sheets for a multitude of new uses, if present indications are borne out by experience, says machinery builder, speaking of sheet mill developments. The new method is heavily patented, and "it would be unfortunate indeed if the situation were handled in any but the broadest, fairest manner. . . ."—Page 1626.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Appraising the Forecasts

WE are in the season of trade forecasts and the wise reader will endeavor to appraise them in the light of the working out of forecasting in past years. Judgment will be according to two points; whether forecasts have shown any consistent tendency to err on one side or the other, the brighter or the darker, and whether they have been borne out with sufficient closeness to justify much reliance being placed upon them in future. Reference of course is here made to forecasts by men who are well posted and whose main object is to tell the truth as they see it.

We have checked over forecasts made by some eminent authorities one year ago and two years ago, i.e., forecasts for 1927 and forecasts for 1928, and compared them with the outcome. On the whole the showing is favorable to the forecasters.

The year 1928 has been a good year and the forecasts a year ago had it so. There was a note of confidence in the utterances and that is made more noteworthy by the fact that this was a presidential year and there had long been a rather widespread opinion that being a presidential year is a distinct handicap.

The forecasts for 1927, on the other hand, had been rather unfavorable. Generally the forecasters spoke of the year as a whole and predicted that it would not be so good as 1926 had been. They were right, broadly speaking, in their statements, but they missed the important point of the two halves of 1927 being quite different. The first half was fairly good, while the second half was distinctly poor. Steel ingot production lost less than 1 per cent from the first half of 1926 to the first half of 1927, whereas from the second half of 1926 to the second half of 1927 it lost 13 per cent. Freight car loadings ran ahead until May, so that the half year showed a slight gain, while the second half was fully 6 per cent under the second half of 1927.

One may be disposed to set a mark against the forecasters for missing this point, but there is another way of looking at it. Apparently they did recognize the underlying conditions and properly appraise their outcome. It would seem that they did not realize how far ahead they were looking. One might say they did not make sufficient allowance for the momentum of business, the year 1926 having been a very good business year, setting up such a pace that it required time for adverse influences to work out into decreased trade. Now, the superficial way to predict is to look things over and predict more of the same, whether good or bad. That the forecasters did not do.

In no sense are the present remarks intended as a forecast, their sole object being to suggest how the forecasts of authorities should be received; but it does seem that we have a set of conditions which while quite different in detail from those of two years ago have this in common, that there is much momentum while some adverse influences have arisen lately. The year 1928 was good in its first half and has been still better in its second half, which means that there has been a gaining in momentum. We shall see now whether the forecasters are disposed to distinguish between parts of the new year. It is convenient to consider a calendar year as a unit but there is no fundamental reason for a year to be uniform in coloring, yet different in coloring from an adjacent year.

Changed Buying in Steel

TWENTY years ago the steel trade of the United States was about to emerge from a very curious situation. In recalling it, the average man would be likely to mention it as "the Gary dinner period," but really the "Gary dinner" movement was simply a means of averting distress. The condition was that of a very light demand upon the steel mills, which in great part was due to the existence of large stocks of finished steel and of large stocks of manufactured wares, such as are sold or distributed, while there was in essence another stock, that of manufacturing and transportation equipment not needed for a time. Jobbers and manufacturing consumers had little occasion to buy steel because they had stocks; their customers had little occasion to buy because they had stocks, and manufacturers and transportation interests had no occasion to add to equipment because they had too much already.

It is the existence of these large stocks to which we wish to direct attention, for present-day methods of conducting business are so different. For several years past there have been virtually no stocks of anything. All along the line "service" is demanded. The average time between the casting of the steel ingot and the rendering of service by the thing produced is but a fraction of what it was twenty years ago.

Production of pig iron in 1908 was 38 per cent less than in 1907 or 1909, those two years having been approximately the same. According to THE IRON AGE blast furnace reports at the time, the steel companies produced 1,514,521 tons of pig iron in October, 1907, their record high, while two months later, in December, they produced only 659,459 tons, only 44 per cent as much. It was not until the following December (1908) that they got back to seven figures for a month's production.

Superficially the appearance was that the stoppage

of things was due to the financial and stock market panic of late October, 1907. As a matter of fact there had been evidence quite early in the year that altogether too strong a pace had been followed. The Steel Corporation's unfilled obligations had reached a maximum on Jan. 1, 1907, at 8,489,718 tons and fell quarter by quarter until they were only 6,425,008 tons on Oct. 1, more than three weeks before the panic occurred. Afterward they declined to 3,313,876 tons July 1, 1908.

There was no such decrease in general trade as in the production of steel. Undoubtedly the actual ultimate consumption of steel in 1908 was much greater than the production. The difference lay in liquidation of stocks of steel and of manufactures of steel.

One cannot conceive of trade nowadays ever working itself into such a position. Stocks are not being carried now and it is extremely improbable they ever will be. Sweeping changes in the manner of doing business would have to occur first, so that there would be ample warning.

It is evident how much better off we are today, how much more economically and efficiently manufacturing and distribution are conducted and how there is no chance of a great manufacturing industry being forced to cramp down simply to allow time for goods it has already produced to be put into use. Consumption will have its ups and downs, though smaller than in the past, but demand will vary only as consumption and not more widely as it used to do.

Misery in Mining Towns

TOGETHER with daily information about King George's illness, American newspapers are carrying stories about the poverty, even starvation, existing among British coal miners. As the culmination of four years of declining production, about 250,000 miners are now unemployed (one in every four), and the remaining workers are getting such meager wages they are demanding increases which an almost prostrate industry is unable to grant. Relief is being organized on a national scale to feed the unfortunates through the winter.

Our contemporary in London, *Metal Industry*, thinks that the causes for this situation date back several years, chief among them being that the mines have been "over-manned; the coal output superabundant, leading to great waste"; and that an unsuccessful attempt has been made by both the miner and employer to maintain "advantages in comfort and in leisure over his European fellows." The editor also sees similar forces acting in the steel and cotton industry, and fears for them a dark future.

Normally such a plight would bring financial help from coal miners in this country, but unfortunately the organization of mine-workers fitted to collect and forward such charity is in trouble itself, and for similar reasons, namely: too many miners, requiring too high wages, in an industry expanding slowly yet installing machines to save more and more of the high-priced labor.

While the distress so widespread now in England may exist in America only in isolated spots, we will be fortunate indeed if it does not get worse before it gets better. Most of our industries are working at good speed, and the miner who is adaptable and willing to work at another job has a fair chance of earning a living. Unluckily, general industrial conditions in England do not afford a similar shift.

A counteracting influence on both sides of the ocean is inertia—a man no longer young has little desire to uproot his life and start out anew. But the sooner such changes forced by broad economic movements are made, the better it is for the individual, the industry, and the nation. We in America thus have the opportunity to avoid much misery if we are forehanded in this business of transplanting the idle miner.

Fancy Prices for Copper

COPPER purchasers are finding that hand-to-mouth buying, which has worked so well during the post-war years, has its limitations. It has been fine to let the producers carry the stocks, as long as the stocks were ample for prompt delivery. As a matter of fact, the statistics (which have been quite precise for nearly ten years) have indicated a continually shrinking reserve of spot copper, and a continually increasing consumption. Thus, whereas the stocks of refined copper in America at the end of 1920 amounted to about 25 per cent of the world's production for that year, the corresponding figure today is as low as 2¼ per cent. Nevertheless during the last five years the price has been low and relatively stable.

This refinery situation has gradually come about by the intelligent use of copper statistics by the producers, whereby each one has been able to regulate his volume of production to the expected consumption. The purchasers, however, did but very recently awake to the fact that all the spot copper in the American refineries would supply no more than three weeks' home needs. Thereupon they rushed to buy, and the price promptly jumped.

As 1928 ends copper and brass mills are paying the miners three cents a pound more than the average price for 1927. This three cents will have to be charged off as the cost of letting the refiner carry the stock of raw material, and eventually the public will pay for this purchasing attitude.

While the price seems to be stabilized for the present at about 16 cents, the situation has many elements of danger. It should be emphasized that there is no necessity for a runaway copper market, nor do the producers wish to see one. All the prominent factors are convinced that price stability is far better than violent fluctuations. If "hand-to-mouth" purchasing has successfully fed the consumers' production schedules for several years past, there is no need now to rush in a larger margin for future operations. It will cost more than the fancied insurance is worth.

Another thing to remember is this: that no matter what premium may be offered, refinery production cannot be expanded instantly. Lake copper might respond quickest; copper from South America comes out more leisurely. On the average, copper mined on New Year's day is not out of the refinery furnace until April.

Thirdly, there is sufficient capacity in mines, concentrators, smelters, and refineries to produce all the copper which will be fabricated in 1929. Even the refinery capacity is 10 per cent greater than the present rate of consumption.

Lastly, the present price of 16 cents is an ample incentive for the producer to supply every legitimate

demand for copper. Red metal from North and South America (which is 70 per cent of the world's production) is made at an average cost of 10.5 cents. As Arthur Notman points out, the 90-year history of the domestic industry proves that a surplus of 3.65 to 3.75 cents for bond interest and dividends is satisfactory to the owners and creditors. A fair conclusion, therefore, is that the copper industry would be maintained in very healthy condition with the metal selling around 14½ cents a pound.

These considerations, viz., that no one wants a fluctuating market, that expansion in production must be gradual, that there is no possibility of a famine, and that the present price is ample, all urge the necessity of calm and considered action in the copper market.

CORRESPONDENCE

Blast Furnace Metal for Castings

To the Editor: The interesting discussion in your Dec. 13 issue, by David Baker, of the use of hot metal from the blast furnace by the foundry, reopens a most important field of development in foundry practice. It is one that should attract the attention of every large foundry operator in this day of mass production and lowering costs.

The problem as it relates to the foundry is closely analogous to that of the use of hot metal by the steel mill. The blast furnace operation is a smelting one, while the processes in the rolling mill are chiefly mechanical. Today, the steel mills obtain the greater part of their pig iron requirements in the molten condition from adjacent blast furnaces. The gap between the metallurgical operation and mechanical operation is successfully bridged.

Iron founding is chiefly a mechanical art. The foundryman is a mechanic, not a melter. His paramount interests are the making of molds and the production requirements pertaining to this effort. Therefore, it is only natural that he should give little thought to, or even resent, the introduction of changes in the conventional means by which his molten metal is provided. If it is necessary to provide facilities for holding, reheating or mixing the hot metal in order to adjust composition or temperature, they are already developed. In this connection it is interesting to note the comments of no less an authority than Henry M. Lane in his paper before the National Founders' Association, as reported in your issue of Nov. 29, on the application of indirect-arc type (Detroit) electric furnaces to the production of gray iron from borings. In view of the difficulties experienced in the use of this material in cupolas, it is hard to account for the fact that the development is only a recent one.

The foundryman's attitude toward the composition of his iron is often paradoxical. When things go smoothly, little attention is paid to the analysis, but when the percentage of scrap goes up, then is the time to question the effect of silicon or carbon. As a matter of fact about five per cent of foundry troubles are due to composition of the metal. We hold our malleable iron, an alloy in which composition is certainly more of a factor than most gray iron, so closely on analysis, that the monthly averages do not vary more than 0.05 per cent in silicon nor 0.15 per cent in carbon. Yet we still have scrap and can find some hard castings and "picture-frame" iron. If the tonnage warranted, I feel that equally satisfactory results could be obtained from direct metal with some adjustment of composition and temperature in an electric furnace.

Nevertheless, new advances will be made in the foundry art. The wasteful reheating of cold metal will be eliminated and the foundryman will lose his fear of the effect of the unknown element in his iron if the hot metal is provided from blast furnaces, run under proper metallurgical supervision. The mechanical and metallurgical viewpoints will be reconciled and the production of iron castings on a more economic basis will be undertaken.

As an international authority on blast furnace practice, Mr. Baker has brought to the attention of the iron foundry industry, a development in the art which should receive serious consideration.

W. F. GRAHAM,
Ohio Brass Co.

Mansfield, Ohio.

Boston Scrap Exporter Reports Good Business

One of the iron and steel scrap dealers in the New England district who has been exporting sizable tonnages of scrap during the year, the J. Lipsitz Co., Chelsea, Mass., states that it has shipped a total of 28,000 tons for export in nine months of 1928 and has 5000 tons which will be moved before Jan. 1. The company says: "The largest steamer we shipped was the Casmona, which went to Genoa, Italy, with 7038 gross tons. The rest of the material shipped during the year went to Danzig. The total of 28,000 tons was shipped in the first nine months of the year, beginning about March 10. The total amount of scrap shipped to Danzig from Boston, according to my records, is approximately 40,000 tons.

"This export business depends entirely upon the steamship market, whether or not steamers are available at reasonable rates. When the steamships get the grain business during the fall, it prohibits the shipment of scrap, as they run up the rates because of easy loading and securing tonnages at a moment's notice during the fall.

"However, we feel that 1929 will surely see exports of fully 50,000 tons of scrap from Boston."

Armco Distributers Meet to Discuss Service

Methods of improving the service of distributers to sheet metal shops were discussed at the annual convention of the Armco Distributers' Association of America in Middletown, Ohio, Dec. 4, 5 and 6. Members who addressed the convention were Guy P. Bible, Horace T. Potts & Co., Philadelphia; D. S. Gaston, Follansbee Brothers Co., Pittsburgh; O. J. Arnold, Arnold & Co., Baltimore; J. O. Kilian, A. M. Castle Co., Los Angeles; Bruce Haines, Hammond Sheet Metal Co., Fort Smith, Ark.; G. L. McKewin, Farwell, Ozmun, Kirk & Co., Minneapolis; F. O. Schoedinger, F. O. Schoedinger Co., Columbus, Ohio; and M. L. Wolfe, Berger Brothers Co., Philadelphia. G. W. Breiel, managing director of the association, discussed the organization's activities during the past year. Armco men who spoke at the business sessions were W. W. Sebald, vice-president; Bennett Chapple, vice-president; D. M. Strickland, manager development department; and G. F. Ahlbrandt, general manager of sales.

Officers elected for 1929 are: A. W. Howe, J. M. & L. A. Osborn Co., Cleveland, president; Quincy W. Wales, Brown-Wales Co., Boston, vice-president; George O. M. Johnston, McClure-Johnston Co., Pittsburgh, secretary-treasurer; and G. W. Breiel, Middletown, Ohio, managing director. Mr. McKewin, Mr. Haines and Mr. Johnston were elected directors.

Speeding Up Railroad Freight Service

"The results of operation in October show that the railway transportation machine of the country is working more efficiently than ever before," says the *Railway Age*. "The real test of each year comes in the last one-third of the year, and usually in October, because usually the peak of the traffic movement is reached in that month. The number of tons carried one mile in October exceeded 48,200,000,000 and was the largest in any month in history excepting October, 1926, in which it was exceeded by only two-tenths of one per cent. The total number of freight cars the railways had on their lines was about 46,500 less than two years previously, but the cars were moved an average of 36.2 miles per day, which surpassed all previous monthly records.

"It is owing to this record-breaking average daily movement per car that the railways, although having available a smaller number of cars, were able to handle the peak movement while maintaining about the same car surplus as two years before. It is interesting to note how completely, in actual performance, the railways have surpassed one of the standards of efficiency in operation that they formerly adopted. When the presidents of the railways, in the spring of 1923, adopted their comprehensive program for increasing the efficiency of operation and rendering an adequate freight service, one of the goals they set was an average daily movement of freight cars of 30 miles. Average miles per car per day in 1920 had been 25.1 and in October of that year 28.6. In the year 1922 it had been 23.5, and in October of that year 26.6. The average attained in the entire year 1923 was 27.8 miles per car per day, and in October of that year a new high record of 30.7 was set. The average mileage per car per day in the first ten months of this year was 31.2; and the new high record of 36.2 in October was 26 per cent better than in October, 1920, 36 per cent better than in October, 1922, and 18 per cent better than in October, 1923.

"The figures reflect prompter loading and unloading of cars by shippers as well as more rapid handling of them by the railways, and show that the freight of the country is being handled with constantly increasing speed. The result is that the length of time each ton of freight is in transit is being shortened, which not only reduces the length of time the investment in it is tied up, but also enables business concerns to reduce the stocks carried by them and the investment in these stocks.

"It has required a large investment by the railways and many improvements in operating methods to effect the speeding up of transportation service that has occurred, and this speeding up of transportation service has had numerous and far reaching effects upon the industry and commerce of the country."

Mechanical Standards Council Organized

Sixty organizations interested in standardization in the mechanical engineering field were invited to join the Mechanical Standards Advisory Council, and a large percentage accepted and sent official delegates to the permanent organization meeting held Dec. 3 at the Engineering Societies Building, New York.

What, when and how to standardize, to the general economic advantage and without embarrassment to the financially concerned interests in the mechanical field, are the basic questions which the mechanical industries undertook to solve.

The fuctions of the Council, as outlined in the constitution adopted at the meeting, are as follows:

1.—To endeavor to obtain, at the request of any interested group, the desired cooperation of organizations in any standardization project in the mechanical field.

2.—To confer with any organization in the mechanical field interested in or carrying on work which eventually may be presented for action under the rules of procedure of the American Standards Association.

3.—To advise the American Standards Association on questions of policy relating to standardization applying to products of the mechanical industries.

4.—To serve as a general coordinating medium in the mechanical field, within the scope of the constitution, by-laws and rules of procedure of the American Standards Association.

5.—To consider (a) the desirability and practicability of standardization projects within its field; (b) the order in which standards shall be developed; (c) the scope of projects; (d) sponsorships for the necessary sectional committees; and (e) the adjustment of conflicts and the clearing up of ambiguities.

6.—To follow up and expedite work in the development of standards.

Representatives of the Society of Automotive Engineers, National Machine Tool Builders Association, American Standards Association, Manufacturers Standardization Society of the Valve and Fittings Industry, American Society for Testing Materials, and American Society of Mechanical Engineers were designated as the executive committee of the new Council.

The meeting held Dec. 3 was preceded by two conferences, held April 7, 1926, and June 20, 1928, respectively.

American Exports Gained Heavily in Some Lines

WASHINGTON, Dec. 24.—Some striking major trends in American foreign trade are shown in a bulletin, "Our World Trade," issued today by the Foreign Commerce Department of the Chamber of Commerce of the United States. These trends, as disclosed by a comparison of export and import figures for the first nine months of 1928 with the average figures for corresponding periods from 1923 to 1927, are:

"Nine-month exports by value this year are 8 per cent more than the five-year average, but imports are only 1.5 per cent greater.

"Exports of finished manufacturers by value gained 25 per cent, while foodstuffs exports fell 23 per cent.

"Canada, our best market, taking 19 per cent of our exports, gained 29 per cent over the average.

"Automotive exports by value are 77 per cent above the average; industrial machinery, 72 per cent; agricultural machinery, 54 per cent.

"Raw silk imports by quantity are 29 per cent above the average; wheat, 58 per cent; rubber, 12 per cent. Sugar is 11 per cent below the average.

"These trends, it is pointed out, clearly indicate that the foreign trade of the United States is forging ahead steadily, disproving predictions to the contrary made in 1921 and 1922—years of readjustment when uncertainty in American foreign trade gave rise to some doubts as to the permanency of enlarged international business.

"Our foreign trade for the first three quarters of 1928," the bulletin says, "totaled $6,628,000,000, nearly 5 per cent greater than the average for the five corresponding nine-month periods of 1923-1927. Exports amounted to $3,559,000,000, the largest since 1920, 1.4 per cent above 1927, and 8 per cent over the above-mentioned average. Imports amounting to $3,070,000,000, though 2.7 per cent below the 1927 total, were still 1.5 per cent above the 1923-1927 average receipts. While our exports for the third quarter of 1928 exceeded one billion dollars for the seventeenth consecutive quarter, our imports for the quarter fell below one billion for the first time since 1924. Exports of foreign merchandise (re-exports), included with total exports, amounted to $76,037,000, or $4,830,000 lower than last year."

German Wire Rope Makers Form a Cartel

WASHINGTON, Dec. 18. — Certain German manufacturers of wire rope are reported to have formed a cartel for the regulation of the export trade with the Scandinavian and Baltic countries, according to a report received by the Iron and Steel Division, Department of Commerce, from Trade Commissioner James E. Wallis, Jr., Berlin. The cartel, organized in October, includes all of the large and medium-sized producers of wire rope.

A sufficient number of signed acceptances having been received from manufacturers, distributers and users of skid platforms, the Division of Simplified Practice of the Department of Commerce has announced that the simplified practice recommendation covering this commodity is now in effect.

Iron and Steel Markets

Production to Pass 50,000,000 Tons

Estimates of Steel Output for 1928 Revised Upward— Holidays to Have Minimum Effect on Operations— New Demands Promise Well for 1929

THE buoyancy of the iron and steel market is manifest in a minimum interruption of production for the holidays and in the welling up of new demands as the opening of the first quarter of 1929 draws near.

Railroad buying, structural steel contracts and inquiries, steel pipe orders, increased tonnage from farm equipment makers and renewed demand from the automobile industry stand out in the activity of the week. While new mill bookings, in toto, have shown some letdown in most districts, specifications are well maintained.

Chicago reports the month one of the best Decembers on record. Mill backlogs there are growing, notwithstanding heavy shipments and a production rate that holds at 85 per cent of ingot capacity. In other centers, some mills report larger shipping orders than in November and producers, generally, will have substantial tonnages still unfilled on Jan. 1.

The holiday interruption of mill operations will vary from one or two days to a full week, with the shorter shutdowns in the majority. Aside from this factor, plant engagement is holding its own, making it virtually certain that steel ingot output for the year will not merely approach 50,000,000 tons, but will exceed that figure by a comfortable margin. The previous record, in 1926, was 46,936,000 tons.

Buying interest in both the pig iron and scrap markets reflects a year-end lull. Old material remains strong, however, and at Pittsburgh heavy melting steel has advanced another 25c. to $18.25 a ton, thereby passing the October peak. With heavy steel scrap commanding a higher price than pig iron, Pittsburgh district steel producers are using more iron in their mixtures and merchant furnace quotations on basic grade are strengthening.

Shipments of merchant pig iron are keeping up surprisingly well, in view of holiday and inventory shutdowns among foundries, and some sellers will start the new year with the smallest carryover of unspecified tonnage since the war. Furnace stocks are also low.

Railroad purchases include 2500 freight cars placed by the Louisville & Nashville. More than 11,000 cars (exclusive of about 6000 for Canadian roads) have been ordered in the past two months, or about 25 per cent of the total to date this year. The Delaware, Lackawanna & Western has placed 10,000 tons of rails and the Missouri Pacific has made formal distribution of 55,800 tons. Rails placed in the current buying movement are estimated at 1,000,000 tons. This total is somewhat smaller than bookings at this time a year ago, but mills look for a compensating increase in purchases in coming months.

Fabricated structural steel awards, including 18,500 tons for the Chicago Board of Trade Building, total nearly 45,000 tons, and the pending list has been augmented by inquiries for 44,000 tons, featured by 32,000 tons for a Baltimore bridge.

A New Jersey aqueduct, tentatively awarded, calls for 38,000 tons of plates. A Milwaukee maker of electrically welded pipe has taken an order for a gas line requiring 40,000 tons, making a total of 174,500 tons recently booked by that company for five major pipe lines.

Farm equipment makers continue to increase their consumption of steel, and automobile parts makers are entering heavier specifications, particularly for forging bars, for delivery early in January. Motor car builders themselves are specifying more liberally for alloy steel bars and body sheets, and are preparing to increase operations, now at a reduced rate, after Jan. 1.

Bar specifications are reported gaining at both Chicago and Pittsburgh, with deliveries extending. The mid-month deadline on releases against fourth quarter contracts for bars, plates and shapes failed to hasten specifying because quotations for the coming quarter represent no advance in prices. In wire products and sheet bars specifications, which are being accepted until the end of the month, have been stimulated by price increases, but for the same reason first quarter contracting has been slow.

Stove bolts in packages, until recently quoted at 80, 10 and 2½ per cent off list, Pittsburgh, are now available at 80, 10 and 5 off, delivered Pittsburgh, Chicago and New England points.

Detroit has awarded 5700 tons of large-diameter cast iron pipe, of which 2800 tons of 36-in. was placed with a French maker at a price figuring back to $31.98 a net ton, Birmingham. The remainder was let to a domestic producer at $33.50, Birmingham.

Machine tool business in 1928 was the largest since 1919 and, for many manufacturers, the greatest since the war. The gain over 1927 ranges from 25 to 50 per cent. The automobile, aircraft and farm equipment industries were conspicuous buyers.

Both of THE IRON AGE composite prices are unchanged, that for finished steel at 2.391c. a lb., the highest level of the year, and that for pig iron at $18.46 a ton.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Dec. 24, 1928	Dec. 18, 1928	Nov. 27, 1928	Dec. 27, 1927
No. 2 foundry, Philadelphia	$21.26	$21.26	$21.26	$19.76
No. 2, Valley furnace	17.50	17.50	18.00	17.25
No. 2, Southern, Cin'ti	20.19	20.19	20.19	19.69
No. 2, Birmingham	16.50	16.50	16.50	16.00
No. 2 foundry, Chicago*	20.00	20.00	20.00	18.50
Basic, del'd eastern Pa	*19.75*	20.25	19.75	19.50
Basic, Valley furnace	17.50	17.50	17.50	17.00
Valley Bessemer, del'd P'gh	20.01	20.01	20.01	19.26
Malleable, Chicago*	20.00	20.00	20.00	18.50
Malleable, Valley	*18.00*	18.25	18.25	17.50
Gray forge, Pittsburgh	18.76	18.76	19.26	18.51
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	100.00
Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh	33.00	33.00	33.00	34.00
Forging billets, P'gh	38.00	38.00	38.00	38.00
O.-h. billets, Phila	38.30	38.30	38.30	38.30
Wire rods, Pittsburgh	42.00	42.00	42.00	40.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.90	1.90	1.90	1.80
Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.12
Iron bars, Chicago	2.00	2.00	2.00	1.90
Steel bars, Pittsburgh	1.90	1.90	1.90	1.80
Steel bars, Chicago	2.00	2.00	2.00	1.90
Steel bars, New York	2.24	2.24	2.24	2.14
Tank plates, Pittsburgh	1.90	1.90	1.90	1.80
Tank plates, Chicago	2.00	2.00	2.00	1.90
Tank plates, New York	2.17½	2.17½	2.22½	2.12½
Beams, Pittsburgh	1.90	1.90	1.90	1.80
Beams, Chicago	2.00	2.00	2.00	1.90
Beams, New York	2.14½	2.14½	2.19½	2.09½
Steel hoops, Pittsburgh	2.10	2.10	2.10	2.20

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Dec. 24, 1928 Cents	Dec. 18, 1928 Cents	Nov. 27, 1928 Cents	Dec. 27, 1927 Cents
Sheets, black, No. 24, P'gh	2.85	2.85	2.75	2.80
Sheets, black, No. 24, Chicago dist. mill	2.95	2.95	2.85	2.90
Sheets, galv., No. 24, P'gh	3.60	3.60	3.50	3.65
Sheets, galv., No. 24, Chicago dist. mill	3.70	3.70	3.60	3.70
Sheets, blue, 9 & 10, P'gh	2.10	2.10	2.00	2.10
Sheets, blue, 9 & 10, Chicago dist. mill	2.20	2.20	2.10	2.15
Wire nails, Pittsburgh	2.65	2.65	2.55	2.50
Wire nails, Chicago dist. mill	2.70	2.70	2.60	2.55
Plain wire, Pittsburgh	2.50	2.50	2.40	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.45	2.45
Barbed wire, galv., P'gh	3.30	3.30	3.20	3.20
Barbed wire, galv., Chicago dist. mill	3.35	3.35	3.25	3.25
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	**$18.25**	$18.00	$17.00	$15.00
Heavy melting steel, Phila	**16.00**	15.00	15.50	13.50
Heavy melting steel, Ch'go	14.50	14.50	14.50	12.25
Carwheels, Chicago	14.00	14.00	14.25	13.50
Carwheels, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh	14.50	14.50	14.50	14.50
No. 1 cast, Philadelphia	16.25	16.25	16.25	16.00
No. 1 cast, Ch'go (net ton)	**15.75**	15.50	15.50	14.00
No. 1 RR. wrot., Phila	15.50	15.50	15.50	15.25
No. 1 RR. wrot., Ch'go (net)	13.25	13.25	13.25	10.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$2.75
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	16.12½	16.12½	16.12½	14.25
Electrolytic copper, refinery	15.75	15.75	15.75	13.75
Zinc, St. Louis	6.35	6.35	6.35	5.65
Zinc, New York	6.70	6.70	6.70	6.00
Lead, St. Louis	6.35	6.35	6.22½	6.30
Lead, New York	6.50	6.50	6.35	6.50
Tin (Straits), New York	49.62½	49.62½	52.87½	58.25
Antimony (Asiatic), N. Y.	*6.75*	9.87½	10.00	11.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Industry Well Satisfied With Immediate Outlook—Holiday Shutdowns Limited to a Few Days

PITTSBURGH, Dec. 24.—Observance of the holidays has caused some letdown in new business in steel products, but no material decrease in specifications. Plant engagement in this and nearby districts suffers only to the extent of a general shutdown of rolling mills extending from last Saturday noon until Wednesday morning. Order books in sheets, tin plate and rails are heavy, and in the past week or so specifications for bars have increased substantially. The final week of the year finds the steel industry well satisfied with the immediate outlook.

A Pittsburgh district railroad car builder recently booked the first worthwhile order in almost a year; it will require approximately 20,000 tons of rolled steel. With other centers reporting increased interest in rolling stock, it seems likely that the railroads will be larger factors in steel buying than they have in the past year.

The agricultural implement industry is taking steel freely. Larger releases against orders for rolled steel, notably sheets, are coming from the motor car builders. Another pipe line order, involving between 400 and 500 miles of 22-in. pipe, is believed to be nearing the closing stage. The trade is counting on more demand next year from the oil and gas industry. In steel construction, other parts of the country appear more active than this territory.

Steel prices show no special change. It is a little early to get a clear line on the recent advance in wire products; although difficulty is encountered in getting buyers to sign first quarter contracts, it is not forgotten that they still have considerable tonnage due them on old commitments. Sheets appear firm. No trouble has been experienced in getting the advance on tin plate. In plates and shapes, the quotations have again become largely local to the Pittsburgh district, in view of the recent reduction announced by a large Eastern producer.

Scarcity of scrap is reflected in prices, and with scrap already commanding more money than pig iron, the use of the latter will be increased. Merchant producers are taking a firmer price stand on basic iron, which, it is believed, will be very sparingly offered by steel companies ordinarily having a surplus for the market.

Pig Iron.—Business remains very quiet, but if melters are indisposed to buy, there is an equal amount of indifference on the part of merchant producers about selling. Prices are firm. The strength of the scrap market is not without effect upon the views of the merchant iron producers, who see a possibility of a contraction in the amount of steel company iron for sale if heavy melting steel continues to become more valuable. The Steel Corporation in the past year has become an important factor in the local scrap situation and is taking so much of the supply that was formerly available for general market sale that it is seriously questioned whether, with a normally full engagement of steel-making capacity, there is enough

steel works scrap to go around. Steel works operations, which are high for this time of the year, promise to increase after the holidays, and it is certain that more scrap or more pig iron must be used. Heavy melting steel is not now to be had at under $18, and even more is asked. Any advance from that price would tend to increase the use of pig iron as the cheaper material and reduce the amount available for market. There is also the possibility that some of the steel companies, ordinarily self-contained, will have to buy pig iron; one company, which has only enough iron production to meet its open-hearth furnace requirements, is faced with the possibility of having to blow out a blast furnace soon for relining. Inquiry recently made by one steel company for basic iron disclosed no lower prices than $17.50, Valley furnace. Some important melters of foundry iron yet are not under cover for the first quarter of next year. In the meantime, while new buying of all grades is light, deliveries on old orders are heavy. Willingness on the part of buyers to take shipments is commonly interpreted as evidence that they do not look for lower prices.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.50
Bessemer	$18.25 to 18.50
Gray forge	17.00 to 17.50
No. 2 foundry	17.50 to 18.00
No. 3 foundry	17.00 to 17.50
Malleable	18.00 to 18.50
Low phos., copper free	26.50 to 27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Semi-Finished Steel.—The holiday interruption to sheet and strip mill operations has meant no similar decline in specifications for billets, slabs and sheet bars. Indeed, in sheet bars buyers seem anxious to postpone paying the advance of $1 a ton the makers have announced on first quarter contracts and are ordering freely on this quarter's commitments. There is a fair amount of first quarter contracting in sheet bars and not much resistance to the higher price. Contracting in billets and slabs also is developing a fair amount of activity. With the price for the next quarter unchanged, no trouble is being encountered in getting wire rod consumers to sign up.

Hot-Rolled Flats.—Makers of strips are ending the year with fairly heavy order books as a result of specifications on this quarter's contracts driven in by a desire by buyers to save the price advantage of this quarter over the first quarter of 1929. Prices show some tendency to yield to the pressure of buyers, and the lower limits of the price ranges are more typical of the ruling levels than the higher ones.

Bars, Plates and Shapes.—Specifications on bars are good in spite of the holiday season. Automobile parts makers are specifying some good-sized January tonnages of cold-finished bars, and makers of the latter in turn are releasing hot-rolled bars. Demand from bolt and nut makers also is fairly active, and there is a fair amount of business from the jobbers. The market is quotable from 1.90c. to 1.95c., base Pittsburgh, on most of the Pittsburgh district business, 2c., base, being, for the most part, an asking price. Pittsburgh mills will get approximately 20,000 tons of plates, shapes and bars in the 1200 car order recently awarded the Pressed Steel Car Co. There is a fair degree of activity in plates and shapes; on local business, prices generally run from 1.90c. to 1.95c., but such prices cannot be obtained in competitive districts.

Rails and Track Supplies.—The Baltimore & Ohio Railroad has distributed the track accessories to go with the rails it recently placed. Local makers of spikes, track bolts and tie plates shared in the awards, which are reported to have been at full prices. Light-section rails are dull, but heavy rails are moving rather well on 1929 contracts.

Wire Products.—Manufacturers are well satisfied with the progress they have made in establishing the higher prices and the new method of sale recently announced on first quarter contracts. There has been a little confusion here and there, and some disputes as to the price classification in which some distributers have found themselves, but, taken as a whole, not much resistance has been met in getting buyers to sign first quarter contracts. It is early for much specifying against them, since jobbers and large consumers have some tonnage still due them on this quarter's commitments.

Tubular Goods.—The pipe line to convey gas from the Monroe, La., field to St. Louis, requiring between 400 and 500 miles of 22-in. pipe, again appears likely to be closed soon. A subsidiary of the Standard Oil Co. of New Jersey is sponsoring this line. It is said to have secured a gas contract for a large plate glass plant now going up in St. Louis; one or two other industrial gas contracts will provide sufficient market for the gas to warrant the building of the line. In other directions, the market shows varying degrees of activity; butt-welded pipe is doing fairly well for the time of year, lapwelded pipe for oil country use is dull, but seamless oil country pipe is in demand.

Sheets.—The holiday season is accompanied by a rather substantial decrease in specifications for the common finishes of sheets, but has not affected the releases of those required in motor car and truck construction, and in the past few days there has been a notable gain in the orders for sheets for railroad cars. Mill operations have suffered from the holiday observance, but tonnage lately released will furnish substantially full operations for next month. Prices are holding well.

Tin Plate.—Several tests of the higher prices named on first quarter and first half tonnages have failed to shake them. Makers generally are well supplied with business, but mill operations are down somewhat since a week ago on account of the inability of mill managers to maintain full crews during the holiday season. Prices of tin plate for re-export are stronger by as much as 25c. per box, compared with those ruling on expiring contracts.

The Iron Age Composite Prices

Finished Steel

Dec. 24, 1928, 2.391c. a Lb.

One week ago	2.391c.
One month ago	2.362c.
One year ago	2.314c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.391c.,	Dec. 11;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

Dec. 24, 1928, $18.46 a Gross Ton

One week ago	$18.46
One month ago	18.59
One year ago	17.54
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$18.59,	Nov. 27;	$17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c. to 2.00c.
F.o.b. Chicago	2.00c. to 2.10c.
Del'd Philadelphia	2.22c. to 2.32c.
Del'd New York	2.24c. to 2.34c.
Del'd Cleveland	1.92½c. to 1.95c.
F.o.b. Cleveland	1.90c. to 1.95c.
F.o.b. Lackawanna	2.00c. to 2.10c.
F.o.b. Birmingham	2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50 and 60-ft. lengths	2.00c.
F.o.b. Pittsburgh mills, cut lengths	2.25c.
F.o.b. Birmingham	2.15c.

Rail Steel

F.o.b. mills east of Chicago dist.	1.85c. to 1.95c.
F.o.b. Chicago Heights mill	1.95c.

Iron

Common iron, f.o.b. Chicago	2.00c. to 2.10c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mills	1.90c. to 2.00c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	2.15c.
Del'd Cleveland	2.09c. to 2.19c.
Del'd Philadelphia	2.10c. to 2.20c.
F.o.b. Coatesville	2.00c. to 2.10c.
F.o.b. Sparrows Point	2.00c. to 2.10c.
F.o.b. Lackawanna	2.00c. to 2.10c.
Del'd New York	2.17½c. to 2.27½c.
C.i.f. Pacific ports	2.20c. to 2.30c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mills	1.90c. to 2.00c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	2.15c.
F.o.b. Lackawanna	2.00c. to 2.10c.
F.o.b. Bethlehem	2.00c. to 2.10c.
Del'd Cleveland	2.09c. to 2.19c.
Del'd Philadelphia	2.06c. to 2.16c.
Del'd New York	2.14½c. to 2.24½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base per Lb.
6 in. and narrower, P'gh	1.90c. to 2.00c.
Wider than 6 in., P'gh	1.80c. to 1.90c.
6 in. and narrower, Chicago	2.10c.
Wider than 6 in., Chicago	2.00c.
Cooperage stock, P'gh	2.10c.
Cooperage stock, Chicago	2.20c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.55c. to 3.50c.
Strips, P'gh	2.85c.
Strips, Cleveland	2.85c. to 2.95c.
Strips, del'd Chicago	3.15c. to 3.25c.
Strips, Worcester	3.00c.
Fender stock, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.65 to $2.75
Galvanized nails	4.65 to 4.75
Galvanized staples	3.35 to 3.45
Polished staples	3.10 to 3.20
Cement coated nails	2.65 to 2.75

	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.50 to $2.60
Annealed fence wire	2.65 to 2.75
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.10 to 3.20
Barbed wire, galv'd	3.30 to 3.40
Barbed wire, painted	3.05 to 3.15

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, W. Va., or Reading, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Woven Wire Fence

Base to Retailers per Net Ton

F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base per Lb.
Nos. 9 and 10, f.o.b. P'gh	2.10c.
Nos. 9 and 10, f.o.b. Chicago dist.	2.20c.
Nos. 9 and 10, del'd Cleveland	2.29c.
Nos. 9 and 10, del'd Philadelphia	2.42c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Chicago dist. mill	2.95c.
No. 24, del'd Cleveland	3.04c.
No. 24, del'd Philadelphia	3.17c.
No. 24, f.o.b. Birmingham	3.00c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh, No. 1 grade	4.00c.
No. 24, f.o.b. P'gh, No. 2 grade	3.80c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.60c.
No. 24, f.o.b. Chicago dist. mill	3.70c.
No. 24, del'd Cleveland	3.79c.
No. 24, del'd Philadelphia	3.92c.
No. 24, f.o.b. Birmingham	3.75c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.10c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential	Net Price 100 Lb. Bars
2000	(½% Nickel)	$0.25	$3.00
2100	(1½% Nickel)	0.55	3.30
2300	(3½% Nickel)	1.50	4.25
2500	(5% Nickel)	2.25	5.00
3100	Nickel Chromium	0.55	3.30
3200	Nickel Chromium	1.35	4.10
3300	Nickel Chromium	3.80	6.55
3400	Nickel Chromium	3.20	5.95
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50	3.25
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70	3.45
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05	3.80
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35	3.10
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45	3.20
5100	Chromium Spring Steel	0.20	2.95
6100	Chromium Vanadium Bars	1.20	3.95
6100	Chromium Vanadium Spring Steel	0.95	3.70
9250	Silicon Manganese Spring Steel (flats)	0.25	3.00
	Rounds and squares	0.50	3.25
	Chromium Nickel Vanadium	1.50	4.25
	Carbon Vanadium	0.95	3.70

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is ¾c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, 9/16 in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	42½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	40	1½ in.	1
2½ in.—2¾ in.	48	1¾ in.	8
3 in.	54	2 in.—2¼ in.	13
3¼ in.—3¾ in.	56	2½ in.—2¾ in.	16
4 in.	59	3 in.	17
4½ in. to 6 in.	48	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

Beyond the above base discounts two fives are being quoted on carload lots of lap-welded steel tubes.

On charcoal iron boiler tubes the base discount is subject to 10 per cent preferential discount on full carload shipments.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	42
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ to 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Less carload, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

This is partly explained by higher prices abroad.

Cold-Finished Steel Bars.—Current business is light, but makers are geting liberal releases on tonnage for shipment after the turn of the year. First quarter contracting is moving without a hitch, chiefly because consumers are being called upon for no advance over what they now are paying.

Cold-Rolled Strips.—Much first quarter business has been written at 2.85c., base Pittsburgh or Cleveland, and that price still is generally regarded as the market, despite the fact that there have been a few deviations from it. Consumers are not taking shipments freely for the present, but have much tonnage on order for shipment after Jan. 1.

Coke and Coal.—Spot supplies of furnace coke still are quite ample for the demand and producers find difficulty in maintaining prices. There has, however, been some curtailment of production and only in a few cases has it been necessary for oven operators to go below $2.75 per net ton at ovens for standard Connellsville coke. Spot foundry coke is dull, but that is the usual condition at this time of the year. Most of the first half Connellsville foundry coke production now is under contract. The coal market presents no important change, except that slack coal is a shade firmer under smaller offerings.

Bolts, Nuts and Rivets.—Stove bolts are being offered at 80, 10 and 5 per cent off list in packages, delivered Chicago or New England points, and that appears as high now as can be done by Pittsburgh producers. Prices otherwise are unchanged. First quarter contracting is fairly active, but current specifications are rather light. Large rivets hold firm at $2.90, base, per 100 lb., less 2½ per cent.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.70c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.35c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Old Material.—The market is very firm on the steel works grades. Consumer buying is light, but dealers, in covering on old orders, find offerings very limited, and they are not actively seeking new orders at current prices. No heavy melting steel appears available at less than $18, and dealers would not sell a round tonnage at that price because so many former local sources of supply have been closed to them lately by direct mill purchases that dependence would be chiefly upon railroad lists or upon distant supply sources. Heavy melting steel cannot be had from either source now to be sold profitably at under $18.50. This grade may be appraised at $18 to $18.50. Dealers are confident that even higher prices will be reached on the next large mill purchase, as available supplies are limited and neither the production nor the collection of scrap is as heavy at this season of the year as at others. The recent sale of compressed sheet scrap at $19 has not been repeated, and in the past week $18.50 has been the top on sales, with dealers reporting purchases at $18 and $18.25.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
Heavy melting steel	$18.00 to $18.50
Scrap rails	18.00 to 18.50
Compressed sheet steel	18.00 to 18.50
Bundled sheets, sides and ends	17.00 to 17.50
Cast iron carwheels	15.00 to 15.50
Sheet bar crops, ordinary	18.50 to 19.00
Heavy breakable cast	15.00 to 15.50
No. 2 railroad wrought	18.00 to 19.00
Hvy. steel axle turnings	16.00 to 16.50
Machine shop turnings	11.50 to 12.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	19.00 to 19.50
Railr. coil and leaf springs	19.00 to 19.50
Rolled steel wheels	19.00 to 19.50
Low phos. billet and bloom ends	21.00 to 21.50
Low phos., mill plates	19.50 to 20.00
Low phos., light grade	18.50 to 19.00
Low phos., sheet bar crops	19.50 to 20.00
Heavy steel axle turnings	16.00 to 16.50
Electric Furnace Grades:	
Low phos. punchings	19.00 to 19.50
Hvy. steel axle turnings	16.00 to 16.50
Blast Furnace Grades:	
Short shoveling steel turnings	12.00 to 12.50
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Rolling Mill Grades:	
Steel car axles	20.00 to 21.00
No. 1 railroad wrought	13.50 to 14.00
Sheet bar crops	19.00 to 19.50
Cupola Grades:	
No. 1 cast	14.50 to 15.00
Rails 3 ft. and under	19.50 to 20.00

Production of electric energy by the New England Power Association in the first 11 months of 1928 was 1256 million kwhr., an increase of 24 per cent over the 1015 million kwhr. for the same period in 1927. About 52 per cent of the total was from hydroelectric plants. The "association" is a subsidiary of International Paper Co., New York. The growth of the system may be noted from the fact that the entire year's output in 1910 was equivalent to only 7 days' peak production in 1928.

Youngstown

Holiday Suspensions Brief Owing to Heavy Orders

YOUNGSTOWN, Dec. 24.—Because of heavy demands for sheets and strips, suspension of rolling mill capacity by Mahoning Valley mills is limited to Monday and Tuesday, with resumptions in most cases scheduled for Wednesday. Sheet mills of the Falcon Steel Co., at Niles, a division of the Empire Steel Corporation, will resume Jan. 1, following several months' idleness. The Newton Steel Co., which originally planned to be down for the week, starts its units Wednesday, owing to heavy orders for full-finished sheets.

The Youngstown Sheet & Tube Co. has blown out for relining its Jeanette blast furnace at the Brier Hill Works, leaving 25 of 37 stacks in this district in blast. This company is planning elimination of its detached plant at Zanesville, consisting of two lap-welded and two buttwelded pipe mills, socket mill and auxiliary equipment.

District mills are well fortified with orders for first quarter and leaders of the trade are optimistic.

Ohio properties of the A. M. Byers Co., Pittsburgh, are idle for the week.

The steel industry in northeastern Ohio closes the year with steel ingot and rolling mill capacity active slightly above 80 per cent.

Motor Wheel Corporation Complaint Dismissed

The Federal Trade Commission has dismissed a complaint against the Motor Wheel Corporation, Lansing, Mich., charged with violation of section 7 of the Clayton act, which prohibits acquisition of capital stock in a competing company where the effect would be to lessen competition or create a monopoly. The Motor Wheel Corporation was charged with acquiring stock in Forsyth Brothers Co., Harvey, Ill., former manufacturer of steel wheels. Counsel for the corporation, appearing before the commission in a final argument last week, declared that Forsyth Brothers Co. had necessarily gone out of business and at the time of executing its contract with the Motor Wheel Corporation was not in competition with or in any sense a competitor of the corporation.

Experiments at the United States Forest Products Laboratory prove that knotty lumber will make a box with short, thick sides more resistant to rough handling than clear lumber, provided the boards have a slenderness ratio—length divided by thickness—less than 60. The laboratory's tests developed that clear boards are not flexible enough when subjected to rough handling to absorb the shocks produced by the box contents and relieve the direct pull on the nails.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	$33.00
Rerolling, 4 in. and under 10 in., Youngstown	33.00
Rerolling, 4 in. and under 10 in., Cleveland	$33.00 to 34.00
Rerolling, 4 in. and under 10 in., Chicago	35.00
Forging quality, Pittsburgh	38.00

Sheet Bars

(Open hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$33.00 to $34.00
Youngstown	33.00 to 34.00
Cleveland	33.00 to 34.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$33.00
Youngstown	33.00
Cleveland	$33.00 to 34.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.90c. to 2.00c.
Universal	1.90c. to 2.00c.
Sheared	1.90c. to 2.00c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	10.00c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basic Swedish, average 65% iron	9.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	36c. to 38c.
Manganese ore, Brazilian, African or Indian, basic 50%	35c. to 37c.
Tungsten ore, high grade, per unit, in 60% concentrates	$11.40 to $12.00

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.75
Foundry, f.o.b. Connellsville prompt	$3.50 to 4.85
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	70c. to 80c.
Gas slack, f.o.b. W. Pa. mines	90c. to 1.00

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$31.00	12%	$35.00
11%	33.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$24.00	10%	$29.00
7%	25.00	11%	31.00
8%	26.00	12%	33.00
9%	27.00		

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	95c. to $1.05
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.00 to 19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works: High-Heat Duty Brick	Intermediate Heat Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 5
Stove bolts in packages, Chicago	80, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10, 5 and 2½
Stove bolts in bulk, Chicago	80, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Structural Steel Award of 18,500 Tons—Mills End Year With Substantial Backlogs

CHICAGO, Dec. 24.—Of primary interest in this market was the placing of 18,500 tons of steel for the new Chicago Board of Trade Building. It is probable that upward of 12,000 tons will be awarded in a day or two for the No. 1 North LaSalle Building. Many pending projects are still open, with little possibility that they will be placed until after the first of the year. In the meantime, structural shops are feeling the pinch of small order books.

Based on preliminary estimates, it is evident that shipments of sheets from local hot mills in 1928 have established a record. Local warehouses are figuring on 1200 tons of sheets needed for forms for reinforced concrete work in the Chicago Mercantile Mart.

Local steel production is steady at 85 per cent of ingot capacity. Specifications are well above current shipments, and mill output will soon be increased. Chicago mills will shut down only on Christmas Day.

This month will be one of the best Decembers on record. Specifications and shipments have been steady, while backlogs have been growing, with the result that the approach to the first quarter is more favorable than has been experienced in many years. Although prices are not above the levels maintained in the fall months, they are showing greater strength. It is probable that users of finished steel products will find deliveries more extended in January than in December. Specifications in recent weeks have been unusually heavy, the bulk of this tonnage being for shipment after the turn of the year. Releases in the past week, while not as large as in the previous week, are 30 per cent heavier than the average week for the year and they are less influenced now by specifications for rails than was the case earlier in the month.

Pig Iron.—This market is enlivened by new inquiry and a few contracts for first quarter and first half. Most foundries have closed for two days at Christmas, but many will resume operations on Wednesday. In previous years it has not been uncommon for melters to shut down for a week or 10 days at this season. Reasons for the change in practice this year appear to lie in the general business situation and the fact that many foundries have sought more stable sources of orders and are depending less on the up and down character of job-lot business. Prices for Northern iron are steady at $20 a ton, local furnace. Although most sellers are quoting $24 a ton, furnace, for charcoal iron, there still are odd lots that can be had at a lower price.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$22.51 to 23.01
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	30.79
Bess. ferrosilicon, 14-15 per cent	47.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Prices for carloads of spiegeleisen are stronger because of heavy order books.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $40.76.

Coke.—Shipments of by-product foundry coke are steady. Preliminary estimates by local producers indicate that deliveries in 1928 will establish a record. Prices are firm at $8 a ton, f.o.b. local ovens.

Bolts, Nuts and Rivets.—Few changes have taken place in this market in the past week. Specifications for delivery after Jan. 1 are heavier. Spot buying is at a standstill.

Wire Products.—Specifications for these commodities are steady, being little influenced by inventory taking. Automobile parts manufacturers in the Cleveland and Detroit districts are taking larger quantities in preparation for an expected increase in demand from makers of automobiles, several of which have already gone into greater production on new models. The jobbing trade is quiet in most sections of the country, it being quite evident that stocks in the hands of distributers are ample to carry them over the holidays. Mills have increased stocks in recent weeks, but of late have cut output to 60 per cent of capacity to more nearly balance with current shipments. Producers' warehouses are better able to meet demands than earlier in the month, but stocks are lower than usual at this time of the year, bearing out the contention made by sellers earlier in the fall that they would meet spring demands by increased production rather than by drawing from stocks built up during the winter months. Shipments and new orders for woven wire fencing are lighter, and the nail demand from rural districts has fallen off sharply. Many users of wire and wire products who have old contracts are specifying freely in an effort to take advantage of the old prices. New sales are small in the aggregate, but on the business taken prices have held.

Reinforcing Bars.—Business in the last week has been confined largely to signing contracts placed just prior to Dec. 15, when quotations at old price levels expired. Billet steel reinforcing bars are steady at 2.35c. per lb. in carload lots out of Chicago warehouses, and it is reported that all lower prices have been withdrawn. In rail steel bars, however, the situation is less clearly defined, with warehouses quoting 2.05c. per lb., and with some old quotations still in the hands of prospective purchasers. Among the active pending jobs is 450 tons for the Fine Arts Building, Chicago. Bids have been rejected for a second time on five Chicago junior high schools, which will take about 1500 tons.

Sheets.—Chicago mills are closing the year with a total production that is near, if it does not exceed, the best previous 12-months' record. Although hot mill operations have not been at capacity in recent months, they have been relatively steady, affording little or no time to make extensive repairs. Several mills will take advantage of the holiday season and will be shut down from Dec. 22 until Jan. 2. Inquiry is developing more rapidly, but forward contracting has reached only about one-half of the tonnage that is normally on books for the first quarter. Prices are holding on business taken for delivery after the first of the year. There is every indication that stocks in the hands of users are small, therefore producers are looking forward to a sharp upturn in demand by the middle of January.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3.00c.; No. 24 galv., 3.75c.; No. 10 blue ann'l'd, 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Cast Iron Pipe.—Detroit has closed for 5700 tons of large size cast iron pipe. A bidder offering French-made pipe has been awarded 2800 tons of 36-in. pipe at $39.90 a ton, delivered, which figures back to $31.98, Birmingham. The United States Cast Iron Pipe & Foundry Co. has taken 800 tons of 36-in., 1500 tons of 24-in. and 600 tons of 48-in. pipe at $41.42 a ton, delivered, or $33.50 a ton, Biringham. Milwaukee is scheduled to open bids on a large tonnage on Dec. 28. On the whole, this market is quiet. Scattered car lots have been taken at $37 to $38 a ton, Birmingham. According to sellers, the indications are that a substantial volume of business will come into the market before the end of January. Many engineers are reported to be busy in preparing plans for spring pipe laying programs.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $42.20 to $46.20; 4-in., $46.20 to $50.20; Class A and gas pipe, $4 extra.

Structural Material.—Fresh inquiry totals 9000 tons and awards are not less than 5000 tons. The expansion of industrial building is further shown by inquiries for steel for an addition to a tractor plant and an open-hearth building. Shops in Milwaukee are reported as busy, while to the west of Chicago output is far below capacity. Local shops are well engaged for this time of the year, but backlogs are small, and all but two or three fabricators will be in need of work before the end of January. Shops are swinging into heavier fabricating schedules on the 38,000 tons of steel

which is to be used in the Mercantile Mart, Chicago.

Mill prices on plain material, per lb.: 2c. to 2.10c. base, Chicago.

Plates.—Welded pipe makers are making heavy drafts against plate contracts held by local steel producers. Plate mills are well engaged when it is considered that recent car purchases have had little bearing so far on schedules. An oil producer in Texas has ordered 1700 tons of plates for storage tanks to be fabricated in the Southwest. Inquiry for steel for large oil storage tanks totals 10,000 tons, the bulk of which will go into the Texas fields. Deliveries on wide plates range from two to four weeks.

Mill prices on plates, per lb.: 2c. to 2.10c. base Chicago.

Rails and Track Supplies. — The local rail market is quiet, except for the arrangement of rolling schedules for 1929 deliveries. Outstanding inquiry remains at 50,000 tons. It is estimated by local sellers that about 1,000,000 tons has been purchased for next year's delivery. It is believed by some this figure is less than the tonnage which had been placed by this time a year ago, but others point to the fact that several large railroads made purchases with large options for 1928. These options were not specified in full. This year these railroads have made purchases plus options, which totals about equal to actual shipments made to them in 1928. Rail mill deliveries in 1928 were heavier than in 1927, and it is generally believed here that 1929 shipments will fully equal those in 1928. Miscellaneous orders for track supplies total 5000 tons and inquiry stands at 16,000 tons. Rail output is a shade higher at 61 per cent of capacity. Track accessory departments are operating at a steady rate, with schedules that indicate an upturn in production about the middle of January.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Old Material.—Prices in Chicago for iron and steel scrap are well maintained. Some specialties, such as railroad malleable and machinery cast, have advanced 25c. a ton on recent sales. A round tonnage of cast iron borings has been taken by a consumer at $12.50 a gross ton, delivered, an advance of 25c. a ton. The supply of heavy tonnage grades seems to be ample to meet users' needs, but dealers are having some difficulty in obtaining carloads of specialties. This is due in part to lower shipments by producers, who are holding scrap to get better car loadings; freezing weather also is playing a part in hampering preparation and shipment. Lighter deliveries are noted to foundries, which at this time of year usually curtail output. Inquiry for immediate delivery is less urgent, but buyers are showing greater interest in the possibility of getting prompt shipments soon after the first of the year. It is noteworthy that most consumers feel confident of the future, and in many instances have well prepared plans for shop schedules for the early part of January.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$14.50 to $15.00
Shoveling steel	14.50 to 15.00
Frogs, switches and guards, cut apart, and misc. rails	15.75 to 16.25
Hydraul. compressed sheets	13.00 to 13.50
Drop forge flashings	10.50 to 11.00
Forg'd, cast and r'l'd steel carwheels	17.75 to 18.25
Railr'd tires, charg. box size	17.50 to 18.00
Railr'd leaf spring cut apart	17.50 to 18.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.00 to 16.50
Coil springs	18.25 to 18.75
Electric Furnace Grades:	
Axle turnings	14.50 to 15.00
Low phos. punchings	16.75 to 17.25
Low phos. plate, 12 in. and under	16.50 to 17.00
Blast Furnace Grades:	
Axle turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Short shoveling turnings	12.00 to 12.50
Machine shop turnings	8.00 to 8.50
Rolling Mill Grades:	
Iron rails	15.00 to 15.50
Rerolling rails	16.50 to 17.00
Cupola Grades:	
Steel rails less than 3 ft.	17.25 to 17.75
Steel rails less than 2 ft.	18.75 to 19.25
Angle bars, steel	16.50 to 17.00
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	17.25 to 17.75
Agricultural	12.50 to 13.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angles and splice bars	14.50 to 15.00
Iron arch bars and transoms	20.50 to 21.00
Iron car axles	26.50 to 27.00
Steel car axles	15.50 to 16.00
No. 1 railroad wrought	13.25 to 13.75
No. 2 railroad wrought	13.00 to 13.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	6.00 to 6.50
Locomotive tires, smooth	13.25 to 13.75
Pipes and flues	9.50 to 10.00
Cupola Grades:	
No. 1 machinery cast	15.75 to 16.25
No. 1 railroad cast	15.00 to 15.50
No. 1 agricultural cast	14.50 to 15.00
Stove plate	12.25 to 12.75
Grate bars	12.50 to 13.00
Brake shoes	11.50 to 12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Cold Rolled Strip.—Forward contracting has progressed steadily at 2.85c. to 2.95c. per lb., Cleveland. The freight rate to Chicago is 30c. per 100 lb. Specifications are lighter, and the industry as a whole is engaged between 65 and 75 per cent of capacity, contrasted with 80 to 85 per cent late in November.

Bars.—Soft steel bar mills are heavily engaged. Specifications are large, making it highly probable that deliveries will be pushed farther into the future. Farm implement manufacturers have been taking increasing quantities of steel and their bar requirements in 1928 have been about 50 per cent larger than in the previous year. Automobile parts makers are entering heavier specifications for delivery in the early weeks in January. Prices for soft steel bars are steady at 2c. to 2.10c. per lb., Chicago. The iron bar market is more active, as indicated by numerous small specifications for delivery in January. The alloy bar market remains steady, with some gains noted from automobile parts makers, who are producing in advance of an expected upturn in automobile output. Forward contracting in rail steel bars is practically complete at 1.95c. per lb., Chicago Heights. Users accustomed to prompt service from mills appear little concerned over deliveries after the start of the new year. Most sizes can be had in 10 days to two weeks.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., base, Chicago; common bar iron, 2c. to 2.10c., base, Chicago; rail steel bars, 1.95c., base, Chicago Heights mill.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.35c.
Reinforc'g bars, rail steel	2.05c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.80c.
Galv. sheets (No. 24)	4.65c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, stand. railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.

	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.30
Com. wire nails, base per keg	3.20
Cement c't'd nails, base per keg	3.20

Germany May Get Cartel Bonus for Low Production

WASHINGTON, Dec. 22.—It would appear that the membership of the German iron and steel industry in the International Steel Cartel has been of advantage in the recently terminated lockout in the Rhineland-Westphalia districts, according to a report received by the Department of Commerce from the trade commissioner in Berlin.

The report says:

"Another thought advanced in press discussion is that this cessation of production, which is almost sure to result in the total output of the German industry falling below the quota set by the cartel for the first time since its inauguration, may prove an actual benefit to the industry. This, it was anticipated, would result from the domestic industry being eligible to receive the $2 per ton paid on all production not greater than 10 per cent below the quota set by the cartel, a circumstance which, with production the full 10 per cent below the quota, would make Germany eligible to receive approximately $632,000 (2,500,000 marks) on the quarterly quota of 3,160,000 metric tons. Analysis, however, would appear to make this very unlikely, largely because production in Germany has, over the past three quarters, exceeded the allotted quota by approximately 600,000 tons per quarter."

New York

38,000 Tons of Plates Awarded for Wanaque Pipe Line—Pig Iron Shipments Heavy

NEW YORK, Dec. 24.—Shipments of pig iron are keeping up at a surprising rate. Melters apparently have virtually no inventories and are taking iron as fast as they are using it. In most instances, buyers have been specifying fully against their fourth quarter contracts, and there will be the smallest carryover to first quarter since the war. Blast furnace stocks are also low, in some cases consisting almost entirely of iron of odd analyses. Three furnaces in the Buffalo district, however, are expected to be lighted shortly. While foundry operations will suffer minimum interruption on account of the holidays, buying interest has been adversely affected. Sales in this district for the week totaled about 7000 tons. Little new inquiry appeared, but a revival in contracting is looked for early in January, since 25 to 30 per cent of the needs of melters for the first quarter is still to be placed, according to estimates by the trade. The General Electric Co. has closed against its first quarter inquiry for 5500 tons for Erie, Pa., and other Eastern plants. Purchases of several hundred tons each have been made against the recent inquiries of the New York Central and the Delaware, Lackawanna & Western railroads. Foundry iron continues to be available at $17.50, base, Buffalo furnace, and $19.50, base, eastern Pennsylvania furnace.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.89 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.39 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.89 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Warehouse Business.—Orders have diminished as the holidays approached, but some jobbers report a few sizable tonnages in the past week. Demand for structural steel has slackened and sheet business is light. On both products occasional shading is noted, but is not widespread. As the early weeks of December have been active, resumption of good business is expected early in January.

Finished Steel.—If the present rate of new orders and specifications continues through the closing days of the month, December will be one of the most satisfactory months of the year. Prices on bars, shapes and plates have generally been adjusted to meet the quotations announced last week by the leading Eastern maker, and a minimum of 2c., Eastern basing points, on plates and shapes and 1.90c., Pittsburgh, on bars, has been adhered to on first quarter business. Small tonnages are commanding prices $1 to $2 a ton higher. One of the largest plate tonnages placed recently in this district will be required by the Wanaque aqueduct for the North Jersey District Water Supply Commission. The project will require about 38,000 tons of steel plates, which is expected to be placed by T. A. Gillespie & Co., low bidder on the general contract, with the Steel Corporation subsidiary. Eastern mills will also benefit by recent freight car orders placed by Eastern and Southern roads, outstanding purchases having been 2500 by the Louisville & Nashville and 100 by the New York Central. The Delaware, Lackawanna & Western has ordered 10,000 tons of 130-lb. steel rails and track supplies. Sheet prices are firm at the new levels, namely, 2.85c., 3.60c. and 2.10c., Pittsburgh, for the black, galvanized and blue annealed grades, respectively, and most of the buyers in this district have contracted for first quarter requirements. Deliveries at the old prices are now being made only from material in stock at warehouses. The demand for standard steel pipe for building work has kept up at a good rate for this season of the year. Specifications for wire nails have been heavy on account of the advance in price, but the last week has seen a general clean-up of old business on makers' books.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.34c.; plates, 2.17½c. to 2.27½c.; struc. shapes, 2.14½c. to 2.24½c.; bar iron, 2.14c. to 2.24c.

Cast Iron Pipe.—Northern and Southern makers of pressure pipe are maintaining prices quite firmly and are booking a moderate volume of tonnage from privately owned companies, which are placing their requirements in gas and water pipe for next year. The Federal Water Service Co., New York, has closed for several thousand tons of water pipe for its subsidiaries, and Stevens & Wood, New York, are expected to place 5000 tons or more of gas pipe before the end of the year. Yonkers, N. Y., has opened bids on about 200 tons of 6-in. water pipe, the second tonnage to be bought by this city in the past fortnight. Active municipal inquiry for pipe is not expected until about the middle of January.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $39.60 to $41.60; 4-in. and 5-in., $44.60 to $46.60; 3-in., $54.60 to $56.60; Class A and gas pipe, $4 to $5 extra.

Reinforcing Bars.—The Turner Construction Co. has ordered 800 tons of reinforcing bars required for the Lackawanna terminal warehouse in Jersey City from the Jones & Laughlin Steel Corporation, but about 7500 tons is still to be bought. Lettings in the past week have been largely for small tonnages, but the volume of pending work is large, and considerable activity is expected after the first of the year. Prices are unchanged and, except in competition with foreign steel, are holding well.

Coke.—Better demand for both foundry and furnace coke is being re-

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.50c.
Flats and squares	4.00c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1¼ x ⅛ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 16 in. and smaller	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
⅛-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
⅛-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.40c.
No. 16	4.25c.
No. 18	4.40c.
No. 20	4.50c.
No. 22	4.60c.
No. 24	4.75c.
No. 26	5.00c.
No. 28*	5.25c.
No. 30	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

flected in firmer prices, but there has been no advance by makers. The foundry grade is being offered at $3.50 to $3.75 per net ton, Connellsville, and furnace coke at $2.85 to $3.05. By-product foundry coke is quoted at $9 to $9.40 per net ton, Newark or Jersey City, and $10.06, New York or Brooklyn. Special brands of beehive coke are available at $4.85, ovens, or $8.56, delivered to northern New Jersey, Jersey City and Newark, and $9.44, to New York and Brooklyn.

Old Material.—Iron and steel scrap prices have begun another upward movement, with No. 1 heavy melting steel quotable at an advance of 50c. per ton, delivered to eastern Pennsylvania consumers, based on two sizable purchases last week. A Coatesville user is understood to have bought a large tonnage of No. 1 steel at $16.50 per ton, delivered, and a Claymont, Del., mill is reported to have paid $16, the total of the two contracts being about 20,000 tons. Other grades of scrap are strong, but buying prices of dealers do not yet show any advance.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.00 to	$12.50
Heavy melting steel (yard)	8.50 to	9.50
No. 1 hvy. breakable cast	11.25 to	11.75
Stove plate (steel works)	8.00 to	8.50
Locomotive grate bars		8.50
Machine shop turnings	7.25 to	7.50
Short shoveling turnings	7.25 to	7.50
Cast borings (blast furn. or steel works)	6.75 to	7.00
Mixed borings and turnings	6.75 to	7.00
Steel car axles	17.00 to	17.50
Iron car axles	24.00 to	24.50
Iron and steel pipe (1 in. dia., not under 2 ft. long)		10.75
Forge fire	8.00 to	8.50
No. 1 railroad wrought	12.25 to	12.75
No. 1 yard wrot., long	11.25 to	11.75
Rails for rolling	13.00 to	13.50
Cast iron carwheels	12.00 to	12.50
Stove plate (foundry)		9.50
Malleable cast (railroad)	10.00 to	10.50
Cast borings (chemical)		11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

Cleveland

Steel Orders and Specifications for December Will Exceed Those in November—Sheet Mills Well Engaged

CLEVELAND, Dec. 24.—Specifications for steel bars, plates and shapes kept up in very satisfactory volume the past week, and most of the tonnage covered by last quarter contracts was ordered out. This steel will be shipped at the convenience of the mills and little of it will be delivered before January. Some specifications have also been issued against first quarter contracts. The tonnage entered by several of the mills during December will run over that of November. There was considerable additional contracting during the week, and most consumers are now covered for the first quarter. Forge shops are placing round lots of steel bars either in specifications or contracts and expect that their plants will be filled with orders from the automotive industry for the first quarter.

Automobile manufacturers have issued liberal specifications for alloy steel and auto body sheets for January shipment, but as yet have not come out with heavy specifications for other products. Evidently this industry has enough material on order to carry it well through January. Many of the motor car builders are now operating at reduced schedules, but will increase production after the first of the month.

Structural activity took quite a spurt the past week. The outstanding award was 7000 tons for a dirigible hangar for the Goodyear-Zeppelin Co., Akron. The market is holding firm at the regular prices of 1.90c. to 1.95c., Cleveland and Pittsburgh, for steel bars and 1.90c. to 1.95c., Pittsburgh, for plates and structural shapes, with some small-lot business going at 2c.

Pig Iron.—Buying has continued in good volume for the holiday season, Cleveland interests having sold 15,000 tons during the week in foundry and malleable grades. The business was nearly all for the first quarter, as consumers are showing very little interest in contracts for iron for delivery beyond April 1. Prices are holding at recent quotations. For out of town shipment, Cleveland furnaces are getting $18.50 for foundry and malleable iron and another Lake furnace interest is holding to $19.50 for eastern Ohio and Indiana shipment. The Michigan market is unchanged at $20. While some foundries have held up shipments during the past week or two, the amount suspended because of the approaching inventory time is less than usual, and several of the furnaces welcome a slowing down in demand in order that they can accumulate iron in their stocks, which are now very low. The large production program announced by the automotive industry for the early part of next year indicates that the demand for pig iron from that source will be heavy for the first quarter.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25		$19.50
S'th'n fdy., sil. 1.75 to 2.25	$22.50 to	23.00
Malleable		19.50
Ohio silvery, 8 per cent		29.00
Basic Valley furnace		17.50
Stand. low phos., Valley	26.50 to	27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—Lake furnaces consumed 4,897,404 tons of ore in November, a decrease of 127,238 tons from October. The amount consumed in November, last year, was 3,813,637 tons. Ore at furnaces Dec. 1 amounted to 33,625,980 tons, and the total amount at furnaces and Lake Erie docks on that date was 40,080,106 tons, compared with 41,471,704 tons on the same date a year ago. Central district furnaces consumed 2,590,851 tons of ore in November, a decrease of 90,499 tons for the month. Lake front furnaces used 2,121,977 tons, a decrease of 39,800 tons, and all-rail furnaces consumed 92,783 tons, a decrease of 1932 tons. Eastern furnaces used 91,793 tons, a gain of 4993 tons. On Nov. 30 there were 167 furnaces using Lake ore in blast, a decrease of two for the month.

Old Material.—A Cleveland mill has bought several thousand tons of high grade No. 1 heavy melting steel at $17, which is about the same price that has prevailed for some time for the quality of scrap specified. The most of this will be shipped in January. While other mills have not come into the market for scrap for delivery after the first of the year, considerable buying is expected early in the month. The market is very firm, and the recent price advance is not bringing out steel making scrap in excess of the supply. Blast furnace scrap is not moving quite as well as steel making grades. The only price change is a 25c. a ton advance in machine shop turnings.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel	$14.75 to	$15.25
No. 2 heavy melting steel	14.25 to	14.75
Compressed sheet steel	14.50 to	15.00
Light bundled sheet stamp'gs	12.00 to	12.50
Drop forge flashings	12.25 to	12.75
Machine shop turnings	10.25 to	10.75
No. 1 railroad wrought	12.75 to	13.00
No. 2 railroad wrought	14.50 to	15.00
No. 1 busheling	12.50 to	12.75
Pipes and flues	9.00 to	9.50
Steel axle turnings	12.50 to	13.00
Acid Open-Hearth Grades		
Low phos. forging crops	16.00 to	16.50
Low phos., billet, bloom and slab crops	17.00 to	17.50
Low phos. sheet bar crops	16.50 to	17.00
Low phos. plate scrap	15.50 to	16.00
Blast Furnace Grades		
Cast iron borings	11.25 to	11.75
Mixed bor'g and short turn'gs	11.25 to	11.75
No. 2 busheling	11.25 to	11.75
Cupola Grades		
No. 1 cast	16.50 to	17.00
Railroad grate bars	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft	16.75 to	17.25
Miscellaneous		
Railroad malleable	16.00 to	16.50
Rails for rolling	16.25 to	16.50

Coke.—The price of Ohio by-product foundry coke has been reestablished at $7.75, Painesville, for January shipments. Specifications have slowed

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.50c.
Galvanized sheets (No. 24)	4.45c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb	$2.95
No. 9 gal. wire, per 100 lb	3.40
Com. wire nails, base per keg	2.95

*Net base, including boxing and cutting to length.

down somewhat because of the approaching inventory time and new business is light.

Sheets.—Mills received considerable business the past week in specifications against old contracts and some orders to apply on first quarter contracts. They now have enough tonnage on their books to keep them busy through the first half of January or longer. Some have made contract obligations that will keep them well filled through the first quarter. The automotive industry has not yet specified very much tonnage on first quarter contracts. The market is firm at regular quotations.

Strip Steel.—Releases to mills of specifications for hot-rolled flats are rather light, but mills are still comfortably filled with orders. Some large consumers have not yet made first quarter commitments. Prices are holding within the range quoted, and makers are adhering to the new card of extras. Cold-rolled strip is also moving rather slowly. The market is being well maintained at the regular 2.85c., Cleveland, price.

Philadelphia

Plate and Shape Contracts Revised to New Levels—Heavy Melting Steel Up $1 Per Ton

PHILADELPHIA, Dec. 24.—Some contracts for first quarter delivery of plates and shapes have been adjusted to the recently announced minimum of 2c. per lb., Coatesville, on plates and 2c., mill, on shapes. Small buyers are being asked to pay a minimum of 2.05c., mill. Although plate prices are firm at the new level, 2c., mill, on shapes is occasionally shaded on desirable tonnages. Sheet prices are firm, but the volume of new contracting has been small.

As a result of two sizable scrap purchases in the past week, No. 1 heavy melting steel shows an advance of $1 a ton.

Pig Iron.—Although steel company furnaces are still adhering to $21 per ton for first quarter tonnage, there is a tendency among merchant furnaces to consider desirable business on the basis of $20.50, the quotation for December delivery. Many foundries are covered for part of the coming quarter, and, with no price advance in prospect, are not inclined to hasten in anticipating their needs farther ahead. Domestic low phosphorus prices are unchanged at $23 to $23.50 per ton, f.o.b. eastern Pennsylvania furnace, but British low phosphorus iron is reported to be obtainable at about $22.50 per ton, duty paid, Philadelphia. Consumers are using up iron rapidly and are frequently pressing for deliveries.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.25
Gray forge	20.50 to 21.00
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	25.29
Va. No. 2X, 2.25 to 2.75 sil.	25.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—A substantial tonnage of bars is under contract for the first quarter at 1.90c. to 1.95c. per lb., Pittsburgh, or 2.22c. to 2.27c., delivered Philadelphia. A number of bar users, however, have not yet renewed contracts, foreseeing no early advance in prices and preferring to buy as their needs arise. Some sizable reinforcing bar tonnages are in the market, including about 1000 tons for an Internal Revenue Bureau building in Washington and about 800 tons for a bridge in Baltimore.

Plates.—Eastern Pennsylvania mills are adjusting contracts to the new minimum of 2c., Coatesville, or 2.10c., Philadelphia. When the tonnage involved is small, the mills insist on a minimum of 2.05c., Coatesville. Prices range from 2c. to 2.05c., Coatesville, or 2.10c. to 2.15c., Philadelphia, with occasional less-carload lots bringing 2.10c., Coatesville.

Shapes.—Contracts at 2.05c., f.o.b. nearest mill to consumer, have been adjusted to the new level of 2c., mill, or 2.06c., delivered Philadelphia, but the market is not entirely firm at the new level, and 2c., mill, is sometimes subject to concession when a desirable tonnage is offered. Several large fabricated projects are in the market, including a building in Washington for the Internal Revenue Bureau, requiring about 10,000 tons, a bridge in Baltimore, calling for 32,000 tons, and a new dormitory at the University of Pennsylvania.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.45c.
Cold-fin. steel, sq. and flats	3.95c.
Steel hoops	3.60c.
Steel bands, No. 12 to ⅜-in., inclus.	3.35c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.00c.
†Galvanized sheets (No. 24)	4.75c.
Blue ann'l'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Warehouse Business.—Orders for shipment from stock continue in good volume, despite the holidays, and the total for the month is expected by most jobbers to compare favorably with that of November.

Sheets.—A moderate number of first quarter contracts have been closed on blue annealed sheets at 2.10c., Pittsburgh, or 2.42c., Philadelphia. In some cases, where competition for narrow sheet business is encountered from continuous sheet mills, 2c., Pittsburgh, has prevailed. Black and galvanized sheet prices are reported quite firm at 2.85c., Pittsburgh, or 3.17c., Philadelphia, for black and 3.60c., Pittsburgh, or 3.92c., Philadelphia, for galvanized. However, contracting has not yet been extensive, and, with many consumers of galvanized sheets covered on old lower-priced contracts until mid-January, a test of present quotations is delayed.

Imports.—In the week ended Dec. 22, 3867 tons of pig iron arrived at this port, of which 3539 tons was from British India and 328 tons from Norway. Ore imports consisted of 750 tons of chrome ore from British India and 502 tons of manganese ore from Java. Steel imports were small, with 74 tons of structural shapes from Belgium and 66 tons from Germany and 55 tons of steel bars and 30 tons of billets from Sweden. Scrap imports consisted of four tons from Germany.

Old Material.—All grades of scrap show a strong undertone. No. 1 heavy melting steel has advanced $1 a ton on purchases totaling between 15,000 and 20,000 tons by consumers at Coatesville, Pa., and Claymont, Del. The consumer at Claymont closed about a fortnight ago on several thousand tons at $15.50 per ton and last week bought upward of 6000 tons at $16, delivered. The Coatesville buyer also bought recently at $15.50 per ton and in the past week paid $16.50 per ton, delivered. Other grades of scrap are not so active as heavy melting steel, but in some instances have registered advances in price of 50c. a ton, based on small purchases.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$16.00 to $16.50
Scrap T rails	15.50 to 16.00
No. 2 heavy melting steel	12.50
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.00
Machine shop turnings (for steel works)	11.00 to 11.50
Heavy axle turnings (or equiv.)	12.50 to 13.00
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	15.50 to 16.00
Railroad grate bars	12.50
Stove plate (for steel works)	12.50
No. 1 low phos., hvy., 0.04% and under	19.00 to 20.00
Couplers and knuckles	17.50 to 18.00
Rolled steel wheels	17.00 to 17.50
No. 1 blast f'nace scrap	10.00 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	18.50 to 19.00
Steel axles	21.50 to 22.00
No. 1 forge fire	12.00 to 12.50
Cast iron carwheels	16.50
No. 1 cast	16.25 to 16.75
Cast borings (for chem. plant)	15.00
Steel rails for rolling	16.50 to 17.00

Fabricated Structural Steel

Bridge at Baltimore Will Take 32,000 Tons—18,500 Tons Awarded for Chicago Board of Trade Building

WITH the Chicago Board of Trade Building requiring 18,500 tons, structural steel awards during the week amounted to 44,800 tons. Other large tonnages placed were 7000 tons for an airship hangar at Akron, Ohio, and 5700 tons for Reading Railroad bridge work. Outstanding in the new work out for bids is a bridge at Baltimore, which will take 32,000 tons of the 44,000 tons reported pending. Awards follow:

BOSTON & MAINE RAILROAD, 2200 tons, five bridges, to Phoenix Bridge Co.

ANDOVER, MASS., 140 tons, dining hall, to New England Structural Co.

NEW YORK, 300 tons, building in East Eighty-eighth Street for Edward Corning, to American Bridge Co.

STATE OF NEW YORK, 150 tons, highway bridge, to American Bridge Co.

ORANGE, N. J., 800 tons, Orange Memorial Hospital, to Hinkle Steel Construction Co.

READING RAILROAD, 5700 tons, bridge work, to Phoenix Bridge Co.

BALTIMORE & OHIO RAILROAD, 250 tons, bridges, to Bethlehem Steel Co.

BEAVER FALLS, PA., 155 tons, Farmers Bank Building, to Fort Pitt Bridge Works.

MOBILE, ALA., 1155 tons, office building for Merchant Securities Co., to Virginia Bridge & Iron Co.

LOUISVILLE, KY., 1700 tons, approaches to Louisville bridge over Ohio River, to American Bridge Co.

AKRON, OHIO, 7000 tons, hangar for Goodyear Zeppelin Co., to American Bridge Co.

CHICAGO, 18,500 tons, Board of Trade Building, to American Bridge Co.

CHICAGO, 200 tons, salesroom for Studebaker Corporation, to Wendnagel & Co., local.

ST. LOUIS, 3000 tons, apartment house at Kings Highway and Maryland Avenue, to Mississippi Valley Structural Steel Co.

ST. LOUIS, 750 tons, open-hearth building for Laclede Steel Co., to Mississippi Valley Structural Steel Co.

KANSAS CITY & GRAND VIEW RAILROAD, 1100 tons, bridges, to Kansas City Structural Steel Co.

LOUISVILLE & NASHVILLE RAILROAD, 800 tons, bridges, to Nashville Bridge Co.

SAN FRANCISCO, 180 tons, gymnasium on Frederick Street, to Dyer Brothers.

SAN FRANCISCO, 146 tons, apartment building, Golden Gate Avenue and Steiner Street, to McClintic-Marshall Co.

EUGENE, ORE., 375 tons plates, three roller type dam gates for Leaburg project, to Willamette Iron & Steel Works.

PORTLAND, ORE., 180 tons plates, sulphite digesters for Oregon plant, to Willamette Iron & Steel Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

NEW YORK, 800 tons, Miss Spence's School in East Ninety-first Street.

STATE OF NEW JERSEY, 1400 tons, three highway bridges in Morris County.

BALTIMORE, 32,000 tons, bridge over arm of Chesapeake Bay.

WASHINGTON, unnamed tonnage, six buildings and alterations at Army Medical Center; bids taken by Construction Service Quartermaster.

PHILADELPHIA 100 tons, dormitory at Hamilton Walk and Thirty-sixth Street for University of Pennsylvania.

PHILADELPHIA, 6000 tons, grade crossing elimination at Manayunk for Reading Co.; Phoenix Bridge Co., low bidder.

ROME, N. Y., 550 tons, building for Rome Wire Works.

BUFFALO, 150 tons, dock shed for Cleveland-Buffalo Transit Co.

BUFFALO, 1000 tons, Burgard Vocational School.

DELAWARE, LACKAWANNA & WESTERN RAILROAD, 450 tons, freight house at Buffalo.

CLEVELAND, 140 tons, building for Continental Lithograph Corporation.

CLEVELAND, 400 tons, Quincy Avenue bridge for Nickel Plate railroad.

CHICAGO, 1500 tons, building for Illinois Bell Telephone Co.

SPRINGFIELD, ILL., 500 tons, building for Monarch tractor division of Allis-Chalmers Mfg. Co.

MINNEAPOLIS, 4500 tons, Northern National Bank Building.

SOUTH CHICAGO, ILL., 530 tons, ore building for Mead Morrison Mfg. Co., Chicago.

SAN FRANCISCO, 155 tons, apartment building at Vallejo and Octavia Streets; bids being taken.

HELENA, MONT., 661 tons, Missouri River bridge; bids opened.

Standardizing Drawings and Drafting Room Practice

Considerable progress has been made by the sectional committee on the standardization of drawings and drawing room practice, which is sponsored by the American Society of Mechanical Engineers and the Society for the Promotion of Engineering Education.

Subcommittee No. 2, on method of indicating dimensions, met Dec. 5 and discussed a proposal which had been drafted by its chairman, E. B. Neil, manager of the research department *Automotive Industries*, Philadelphia, after careful study of the practices of a large number of industrial plants. A chart indicating proposed standard arrangement and view of mechanical drawings which employ the third angle of projection, submitted by subcommittee No. 4, on layout, has met with unanimous approval. F. G. Wolff, assistant to the general mechanical engineer American Car & Foundry Co., is chairman of the committee. Replies to a questionnaire sent to 878 firms are being summarized by subcommittee No. 3, on lettering, which is headed by T. G. Crawford, supervisor of drafting, General Electric Co. Subcommittee No. 5, on line work, which has submitted three proposals, will issue a revised report shortly. Samuel Ketchum, engineer M. H. Treadwell Co., New York, is chairman.

Proposals for graphical symbols on drawings have been distributed by subcommittee No. 6, which is headed by G. H. Drake, chairman of the standardization committee of the National Association of Master Plumbers. Copies of the proposal are now being considered by the American Institute of Architects. Work of this committee also includes a series of graphical symbols proposed by the American Society of Heating and Ventilating Engineers.

Automobile Production Will Be a Record

NEW YORK, Dec. 24.—*Automotive Industries* this week will say:

"With a production of approximately 300,000 in December indicated by operations in car and truck factories, the total production for the industry in 1928 will be brought to about 4,650,000, an increase of about 150,000 over the former record total set up in 1926. Production for the industry in 1927 totaled 3,580,000, more than a million lower than in the present year.

"Operations in the closing week of the year will be reduced by the holidays, but only a few will be closed for inventories or other late year purposes. In many plants, work will actually be speeding up on new models, which have been sold ahead for varying periods in 1929. Ford dealers, though running into a slow delivery period in December, still have orders many weeks ahead, and Chevrolet and Willys-Overland dealers have built up large order books at their December showings."

Production of Files $12,973,734 in 1927

WASHINGTON, Dec. 24.—The production of files by 36 establishments engaged primarily in that line represented a value of $12,973,734 in 1927, a decrease of 4.2 per cent reported by 38 establishments in 1925 with a value of $13,540,953, according to the Bureau of the Census. The 1927 values by types were as follows: Files and rasps, metalworking, $11,854,620; woodworking, $95,743; other files, $396,166; other products and amount received for repair work, $627,205. Of the establishments reporting for last year, seven were located in New Jersey, seven in Pennsylvania, five in New York, five in Ohio, three in Rhode Island, two in Connecticut, two in Illinois, two in Indiana, one in Iowa, one in Massachusetts and one in Michigan.

Boston

Pig Iron Sales Drop to Low Point—Finished Steel Business Good for Time of Year

BOSTON, Dec. 24.—Pig iron sales in this territory during the past week dropped to a minimum. Some of the Buffalo district furnaces reported larger bookings, but individual sales were in small tonnages and failed to bring the week's business up to the previous week's level. A fair amount of Indian iron also was sold. Buffalo iron is still offered at $17.50 a ton, furnace, for No. 2 plain, and $18 for No. 2X, while all sales of No. 1X reported were at $19, instead of $19.50, as openly quoted. Indications are the Mystic Iron Works' December sales will total 25,000 tons. In that event December will be the second largest month for sales in the history of the stack.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25	$22.41 to $22.91
*Buffalo, sil. 2.25 to 2.75	22.91 to 23.41
East. Penn., sil. 1.75 to 2.25	24.15 to 24.65
East. Penn., sil. 2.25 to 2.75	24.65 to 25.15
Va., sil. 1.75 to 2.25	26.91
Va., sil. 2.25 to 2.75	27.41
Ala., sil. 1.75 to 2.25	23.41 to 25.77
Ala., sil. 2.25 to 2.75	23.91 to 26.27

Freight rates: $4.91 all rail from Buffalo; $3.65 from eastern Pennsylvania; $5.21 all rail from Virginia; $6.91 to $8.77 from Alabama.
*All rail rate.

Coke.—Specifications against 1928 by-product foundry coke contracts are exceptionally heavy for late December. Foundries are busier than they were a year ago. Specifications also have been made for early January shipments. New England producers quote such fuel at $11 a ton, delivered within a $3.10 freight rate zone, unchanged from a month ago, but 50c. a ton less than a year ago. Domestic by-product coke is in good demand and ovens are pushed to the limit to keep up with orders.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Finished Material.—Sales of finished material in general by the leading steel mills so far in December have run approximately 12 to 15 per cent ahead of those for November, and considerably more than that ahead of December last year. November sales in some instances were the best for any one month this year.

Old Material.—A marked slump in shipments of old material out of New England occurred in the past week. Brokers say there is nothing significant in the slump, and that it usually comes just before the close of a year. There have been no changes in prices. Further activity in the export market is expected after Jan. 1. Exporters have experienced difficulty in securing shipping space. Wire, rails, poles and other street railway equipment, representing an investment of $2,060,718, have been sold by the Springfield Street Railway and the Worcester Consolidated Street Railway to the New England Allite Corporation, Worcester, Mass.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$11.00 to $11.50
Scrap T rails	10.50 to 11.00
Scrap girder rails	10.00 to 10.25
No. 1 railroad wrought	11.50 to 12.00
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	6.25 to 6.50
Cast iron borings (steel works and rolling mill)	6.00 to 6.25
Bundled skeleton, long	9.00 to 9.25
Forge flashings	9.00 to 9.50
Blast furnace borings and turnings	5.75 to 6.10
Forge scrap	7.50 to 8.00
Shafting	13.00 to 13.50
Steel car axles	16.00 to 16.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.50 to 10.00
Rails for rolling	11.50 to 12.00
Cast iron borings, chemical	10.00 to 10.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.00 to $14.50
No. 1 machinery cast	15.00 to 15.50
No. 2 machinery cast	13.00 to 13.50
Stove plate	11.00 to 11.50
Railroad malleable	15.50 to 15.75

St. Louis

Missouri Pacific Orders 55,800 Tons of Rails—3000 Tons of Steel Awarded for Apartment House

ST. LOUIS, Dec. 24.—Holiday dullness has affected the pig iron market, and sales were very light in the past week. Sales of the St. Louis Gas & Coke Corporation totaled only 1050 tons; the largest order was for 250 tons for an Illinois stove foundry. All sales were for first quarter. Two East Side melters are negotiating for a total of 1500 to 2000 tons, which will be closed this week. Shipments of the Granite City maker for December are expected to be about 40,000 tons ahead of those of the same month last year. Stove makers in the district have closed down for inventory and repairs over the holidays, but jobbing foundries will be down probably only for Christmas day. The market continues firm at unchanged prices.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$20.00
Malleable, f.o.b. Granite City	20.50
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	20.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 81c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Domestic coke is moving in large volume as a result of the colder weather, and the Granite City by-product concern has been able to materially reduce its piles. Heavy melt has caused a greater consumption of foundry coke.

Rails and Track Supplies.—The Missouri Pacific, including the International-Great Northern, has purchased 55,800 tons of 90 and 110-lb. rails; 151,000 pairs of angle bars and 24,000 kegs of track spikes and bolts. The rails were divided among the Illinois Steel Co., Inland Steel Co., Colorado Fuel & Iron Co., Tennessee Coal, Iron & Railroad Co. and Bethlehem Steel Co. These companies and the Sheffield Steel Co., Scullin Steel Co. and Railroad Supply Co. will furnish the track supplies, according to an announcement of the purchasing department.

Finished Iron and Steel.—The most important transaction of the week was the award to the Mississippi Valley Structural Steel Co. of 3000 tons for an apartment house at Kingshighway and Maryland Avenue. The Illinois Highway Commission opened bids this week for highway paving and bridge work that will require about 2250 tons of reinforcing bars. Specifications for sheets and plates have been received in satisfactory volume by the Granite City Steel Co. Warehouse business has been falling off steadily since Dec. 15.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24)	4.10c.
Galv. sheets (No. 24)	4.95c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.15c.
Galv. corrug. sheets	5.00c.
Structural rivets	3.75c.
Boiler rivets	3.75c.

	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb	50

Old Material.—The market for old materials was quiet during the past week, and only a few sales of items needed for fill-in purposes were made. However, the market is strong, in expectation of a heavy buying movement which is expected to develop soon. Railroad lists: Chicago & Eastern Illinois, 800 steel underframe gondola cars; Great Northern, 2500 wheels; and Frisco lines, 37 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.25 to $13.75
No. 2 heavy melting or shoveling steel	12.50 to 13.00
No. 1 locomotive tires	14.50 to 15.00
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart	15.00 to 15.50
Railroad springs	16.25 to 16.75
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	13.25 to 13.75
No. 1 busheling	9.50 to 10.00
Cast iron borings and shoveling turnings	8.75 to 9.25
Iron rails	13.50 to 14.00
Rails for rolling	15.50 to 16.00
Heavy turnings	9.50 to 10.00
Steel car axles	19.50 to 20.00
Iron car axles	27.00 to 27.50
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought	13.00 to 13.50
Steel rails, less than 3 ft.	17.50 to 18.00
Steel angle bars	14.25 to 14.75
Cast iron carwheels	14.50 to 15.00
No. 1 machine cast	15.50 to 16.00
Railroad malleable	15.00 to 15.50
No. 1 railroad cast	14.00 to 14.50
Stove plate	12.50 to 13.00
Agricult. malleable	11.50 to 12.00
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Canada

Structural Steel Leads in Market Activity

TORONTO, ONT., Dec. 24.—While there has been a slight curtailment of spot pig iron buying, general business in this market continues active. A considerable number of orders have been taken for first quarter delivery. About 60 per cent of the contract buyers have covered first quarter needs. Canadian pig iron prices have not changed during the week; sales are being made at $23.60, Toronto, for No. 1 foundry iron, and at $25 to $25.50 in the Montreal district.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	25.00
No. 2 fdy., sil. 1.75 to 2.25	25.00
Malleable	25.00
Basic	24.00
Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—As a result of the record building year in Canada, several structural steel fabricators have made extensive enlargements to plants to cope with the demand. Business has fallen off in the past week, but prospects are good. In eastern Canada, Toronto heads the list in projected building; pending jobs include 1200 tons for new building on St. Joseph Street, Toronto, for St. Michael's College; 1200 tons for new automobile building at the Canadian National Exhibition, Toronto; 1200 tons for an office building on Richmond Street, and 5000 tons for a 20-story hotel on York Street, Toronto; 2500 tons for building for Victoria College, Toronto; 250 tons for factory for Rogers Batteryless Radio Co, on Fleet Street, Toronto; 125 tons for addition to plant of General Steel Wares, Ltd., London, Ont.; 250 tons for factory at Cap de la Madeleine, Que., for Claude Denis & Co.; 600 tons for addition to Empress Hotel at Victoria, B. C., for the Canadian Pacific Railway.

Old Material.—Prices in the Toronto and Montreal markets show no change for the last week of the year.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$9.50	$7.00 to $7.50
Rails, scrap	10.00	9.00
No. 1 wrought	9.00	11.00 to 11.50
Machine shop turnings	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings	7.50	6.50
Cast borings	7.50	5.00
Steel turnings	7.00	5.50
Wrought pipe	5.00	5.00
Steel axles	14.00	20.00
Axles, wrought iron	16.00	22.00
No. 1 machinery cast	....	16.00 to 17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Birmingham

Many Plants to Be Shut Down for Five-Day Holiday Period —First Quarter Outlook Good

BIRMINGHAM, Dec. 24.—The only new pig iron business during the past week was a few small-lot sales. First quarter iron is more nearly covered than it has been for any like period in several seasons. Shipments are lighter as plants prepare to shut down for the holiday period. Prices are unchanged; one company quotes $17 and the others $16.50. There have been no changes in furnaces in blast; eight are on foundry, nine on basic, one on ferromanganese and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$16.50 to $17.00
No. 1 fdy., 2.25 to 2.75 sil.	17.00 to 17.50
Basic	16.50

Finished Steel.—New business and inquiries have held up remarkably well during a period that has nearly always been dull. Prospective business is reported by sales officials to be very good. Shipments dropped considerably during the past week. Major operations in the district are to be closed down for a five-day period beginning Dec. 22. Structural steel fabricators report more business on books than in several months. The Virginia Bridge & Iron Co. has booked 1155 tons for an office building at Mobile. On Dec. 19 this company shipped 32 carloads for the American Enka Corporation at Asheville, N. C. Reinforcing bar manufacturers have had a good week. New orders received by the Connors Steel Co. include 180 tons for a warehouse at Birmingham and 175 tons for a gymnasium at New Orleans. During the past week the Tennessee company operated seven and eight open-hearths at Ensley and seven at Fairfield. The Gulf States Steel Co. continues to work four at Alabama City.

Cast Iron Pipe.—The market has been passive during the past week in new business. Prospective business for the first quarter is becoming more encouraging as public utility and municipal requirements are made known. Good tonnages are in prospect from Detroit and Milwaukee. Feelers from public utilities indicate that several tonnages ranging from 15,000 to 50,000 tons will be up for figures in the near future. Most of the plants in the district will be closed down from a week to 10 days during the holiday period. Makers are maintaining quotations of $37 to $38 on 6 in. and larger sizes.

Coke.—Buying has slackened, and new business is expected to be small until after the holidays.

Old Material.—Only a small amount of buying is being done. Inquiries are light and the condition of the market has changed very little. Dealers look for an active market after the holidays.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$12.50
Scrap steel rails	$12.00 to 12.50
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00
Stove plate	13.50
Steel axles	19.00 to 20.00
Iron axles	21.00 to 22.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	14.00 to 15.00
No. 1 cast	15.00
Tramcar wheels	13.00 to 14.00
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

Directors of the Laclede Steel Co., St. Louis, have declared a 50 per cent stock dividend to be submitted to stockholders on Feb. 28. Under the plan the present capitalization will be increased from $2,750,000 to $4,125,000, and stockholders will receive one new share for each two shares now held. It also is intended to lower the par value of the stock from $100 to $20, and issue five new shares for each share now held, which would give stockholders 7½ shares for each share now held. In 1928, the stock paid cash dividends of $15 a share.

Pacific Coast

Cast Iron Pipe Leads in Week's Business—Most Lines Suffering from Year-End Dullness

SAN FRANCISCO, Dec. 22 (*By Air Mail*).—Bookings of iron and steel products on the Coast during the past week consisted mostly of cast iron pipe tonnages, of which a fair aggregate was placed. Outstanding was 1350 tons for a street improvement project in Los Angeles, awarded to the American Cast Iron Pipe Co. Mill representatives look for little new steel business until after the first of the year. The price situation is fairly firm in most lines, with the exception of out-of-stock quotations on reinforcing steel bars in Los Angeles and San Francisco.

Building permits issued in Los Angeles up to and including Dec. 12 numbered 1058, with an estimated valuation of $2,802,266, compared with 1052 permits and a valuation of $2,673,711 for the corresponding period in December, last year. So far this year, $94,448,713 in permits has been issued, compared with $118,978,201 for the same period in 1927.

Pig Iron.—Trading in foundry pig iron is limited to unimportant lots. Little improvement is noted in the rate of operations among the jobbing plants. Prices continue unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	24.00 to 25.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars. — Reinforcing steel bar awards, with two exceptions, were confined to lots of less than 100 tons. The Northwest Steel Rolling Mills took 200 tons for highway work for the State at Olympia, Wash. An apartment in Los Angeles calling for 200 tons was placed with an unnamed interest. No new inquiries of importance came up during the week. Bids have been opened on 276 tons for highway work in Imperial County, Cal., and on 121 tons for the Missouri River bridge at Helena, Mont. Prices on mild steel bars continue firm at 2.30c., c.i.f. Coast ports, while out-of-stock quotations of reinforcing bars in Los Angeles and San Francisco continue weak at 1.80c., base.

Plates.—From present indications, plate awards during 1928 will fall considerably below the aggregate booked last year. The Willamette Iron & Steel Works took 375 tons for three roller type dam gates for the Leaburg project at Eugene, Ore., and 180 tons for sulphite digesters for an Oregon plant. Bids were opened this week on 250 tons for a steel storage tank for the Marin Muncipal Water District at San Rafael, Cal. Prices are firm at 2.25c. c.i.f.

Shapes.—Although fabricators are fairly busy figuring on new work, awards this week were by no means heavy. Dyer Brothers secured 180 tons for a gymnasium in San Francisco and McClintic-Marshall Co. took 146 tons for an apartment in San Francisco. Bids were opened this week on 661 tons for the Missouri River bridge at Helena, Mont. Plain material continues firm at 2.35c., c.i.f. Coast ports.

Cast Iron Pipe.—Cast iron pipe representatives are keenly interested in the inquiry put out by Portland for 3135 tons, bids on which are to be opened Dec. 28. Alternate bids are being taken on Class B and sand cast pipe, the sizes ranging from 4 to 20 in. The American Cast Iron Pipe Co. booked 1350 tons of 2 to 10-in. Class B pipe for Lomita District No. 13, Los Angeles. The Pacific States Cast Iron Pipe Co. secured 250 tons of 4 and 8-in. Class 150 pipe for the East Bay Water Co., Oakland, 100 tons of 4 to 8-in. Class 150 pipe for Patterson, Cal., and 150 tons of 6 and 8-in. Class 150 for Riverside, Cal. Friday Harbor, Wash., placed 292 tons of 4 to 8-in. Class C pipe with the United States Cast Iron Pipe & Foundry Co., Burbank, Cal., awarded 66 tons of 4 and 6-in. Class B and 260 tons of 4 to 8-in. Class 250 pipe to the Pacific States Cast Iron Pipe Co. and the American Cast Iron Pipe Co., respectively. Bids have been opened on 324 tons of 6-in. Classes B and C pipe for San Diego.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ¾-in. and over	3.15c.
Small angles, under ¾-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	5.00c.
Blue ann'l'd sheets (No. 10)	4.00c.
Galv. sheets (No. 24)	5.40c.
Struc. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Cincinnati

Coke and Scrap Prices Higher—Sheet Mills Well Occupied With Releases for January Shipment

CINCINNATI, Dec. 24. — The past week has been the dullest of the year in the pig iron market. Scattered sales of small lots of Northern foundry iron totaled less than 2000 tons, and there are no pending inquiries of consequence before the trade. The price situation remains unchanged. One Alabama furnace is asking $17, base Birmingham, but all other Southern producers are taking business at $16.50. Southern Ohio foundry iron is quoted nominally at $18.50 to $19, base Ironton. Indications are that consumers will not resume buying on an appreciable scale until about the middle of January.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$20.39 to $20.89
Ala. fdy., sil. 1.75 to 2.25	20.19 to 20.69
Ala. fdy., sil. 2.25 to 2.75	20.69 to 21.19
Tenn. fdy., sil. 1.75 to 2.25	20.19
S'th'n Ohio silvery, 8 per cent	27.89 to 28.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—District sheet manufacturers report that bookings this month have exceeded production by a comfortable margin, so that unfilled tonnage is at the highest point in several months. Maintenance of the present operating schedules well into January is assured. Automobile companies working on new models are beginning to ask for body stock, and in some cases orders for rush delivery have been placed. Prices are showing strength, with blue annealed at 2.10c., base Pittsburgh, black at 2.85c., galvanized at 3.60c., and automobile body sheets at 4.10c. The fact that quotations on bars, shapes and plates are not changed for first quarter has taken away any price incentive which might lead to heavy specifications during the last few weeks of the year. Consequently, these products are quiet, but are steady at 1.90c. to 2c., base Pittsburgh. Rail steel reinforcing bars are quoted by a local maker at 1.90c. to 1.95c., base mill. The wire goods market is sluggish. Manufacturers are asking $2.65 per keg, base Ironton, for common wire nails.

Coke. — By-product domestic coke for shipment to Cincinnati from district ovens will go up 50c. a ton Jan. 1, the new delivered prices being $5.50 on walnut, $5 on No. 2 nut and $6.50 on egg. The schedule in Indiana will remain at the present level of $4 on walnut, $3.50 on No. 2 nut and $5 on egg. At Detroit, by-product domestic egg advanced 50c. a

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	3.90c.
Galvanized sheets (No. 24)	4.75c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb	7.55

	Net per 100 Ft.
Lap-weld. steel boiler tubes, 2-in.	$13.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

ton to $6.50, ovens, on Dec. 20. However, shipments for the remainder of the month specified previous to that time are being made at the old price. By-product foundry coke in this district is firm and unchanged at $7, ovens, or $9.14, delivered Cincinnati. Wise County beehive foundry coke is quoted at $4.50 to $5.25, ovens, and New River beehive foundry at from $6.50 to $7, ovens.

Old Material.—For the second consecutive week, heavy melting steel has advanced in price, while scrap rails, sheet clippings, bundled sheets and railroad wrought also have advanced from 25c. to 50c. a ton. District steel plants are accepting a moderate amount of scrap on current contracts, but fresh buying has been negligible. The growing strength of prices is based largely on an anticipated increased demand for scrap during January and February rather than on the present rate of consumption.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.75 to $14.25
Scrap rails for melting	13.50 to 14.00
Loose sheet clippings	9.75 to 10.25
Bundled sheets	10.50 to 11.00
Cast iron borings	9.75 to 10.25
Machine shop turnings	9.00 to 9.50
No. 1 busheling	11.00 to 11.50
No. 2 busheling	7.00 to 7.50
Rails for rolling	14.00 to 14.50
No. 1 locomotive tires	14.00 to 14.50
No. 2 railroad wrought	13.75 to 14.25
Short rails	19.00 to 19.50
Cast iron carwheels	12.50 to 13.00
No. 1 machinery cast	18.50 to 19.00
No. 1 railroad cast	15.00 to 15.50
Burnt cast	10.00 to 10.50
Stove plate	10.00 to 10.50
Brake shoes	10.25 to 10.75
Railroad malleable	14.75 to 15.25
Agricultural malleable	13.75 to 14.25

Finished Iron and Steel.—Mill operations have sagged sharply owing to the usual holiday lull and the disposition of the mills not to produce in excess of the demand. Bethlehem Steel Co. is down to a 50 to 60 per cent operation of mills and a corresponding drop in open-hearth operation. Several sizable structural jobs are out, but have not yet been awarded. Reinforcing bars are slow. Mills are confident of good conditions during the first quarter.

Buffalo

Pig Iron Shipments Heavy—Steel Mill Operations Sag—Scrap Market Is Stronger

BUFFALO, Dec. 24.—The inquiry for pig iron in this territory is light over the holiday period, but shipping directions are extremely good and in some instances have been put ahead of schedule. The melt is exceptional. The General Electric Co. inquiry for 5700 tons for its various plants is still open, but the probability is that it will be placed very soon. A Pennsylvania melter seeks 300 to 400 tons of malleable, and an inquiry from the eastern part of the State is for 500 tons of foundry. An interest in the Buffalo district has inquired for 500 tons of low silicon malleable. A Donner furnace, which has been out for repairs, is expected to go back in blast about Jan. 1. Prices in the district are firm, but on sizable business for outside shipment differentials on silicon content are sometimes shaded.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$18.00 to $18.50
No. 2X fdy., sil. 2.25 to 2.75	18.50 to 19.00
No. 1X fdy., sil. 2.75 to 3.25	19.50 to 20.00
Malleable sil. up to 2.25	18.50 to 19.00
Basic	17.50 to 18.00
Lake Superior charcoal	27.28

Old Material.—Buying has been occasional, but the market is strong, with a shortage of several grades, notably No. 1 heavy melting steel. Brokers in Youngstown and Pittsburgh have been offering $18, delivered to those points, for hydraulic compressed and No. 1 steel. This has drawn considerable of these grades from this territory. Dealers here predict $18 for heavy melting steel within 30 days. Reduced operation of plants supplying turnings to the market has created something of a shortage for blast furnace requirements. There have been several sales of railroad knuckles and couplers and rolled steel wheels at $17.50 to $18 and some short shoveling turnings have been sold at $12.50 to $13. It is understood that the last tonnage of hydraulic compressed sold in this district brought $17, though this may be an outside price.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$15.50 to $16.50
No. 2 heavy melting steel	13.25 to 14.00
Scrap rails	15.50 to 16.00
Hydraul. comp. sheets	13.50 to 14.00
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	13.00 to 13.75
No. 1 busheling	14.50 to 15.50
Hvy. steel axle turnings	13.50 to 14.00
Machine shop turnings	7.50 to 8.00
No. 1 railroad wrought	12.50 to 13.00
Acid Open-Hearth Grades	
Knuckles and couplers	17.50 to 18.50
Coil and leaf springs	17.50 to 18.00
Rolled steel wheels	17.00 to 17.50
Low phos. billet and bloom ends	18.00 to 18.50
Electric Furnace Grades	
Short shov. steel turnings	11.00 to 11.50
Blast Furnace Grades	
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 12.00
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades	
No. 1 machinery cast	15.50 to 16.00
Stove plate	14.50 to 14.75
Locomotive grate bars	13.00 to 13.50
Steel rails, 3 ft, and under	17.50 to 18.00
Cast iron carwheels	13.00 to 13.50
Malleable Grades	
Industrial	16.00 to 16.50
Railroad	16.00 to 16.50
Agricultural	16.00 to 16.50

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex	4.45c.
Rounds	3.95c.
Cold rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb	3.75

Detroit Scrap Higher

DETROIT, Dec. 24.—The market on old material is stronger, with hydraulic compressed registering an advance of 50c. to 75c. a ton, while heavy melting and shoveling steel, borings and flashings are 25c. higher.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$13.75 to $14.25
Borings and short turnings	9.25 to 9.75
Long turnings	8.50 to 9.00
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.00 to 20.50
Hydraul. comp. sheets	13.50 to 14.00
Stove plate	11.00 to 12.00
No. 1 busheling	11.00 to 11.50
Sheet clippings	8.00 to 8.50
Flashings	11.75 to 12.25

A. O. Smith Pipe Orders Total 174,500 Tons

The A. O. Smith Corporation, Milwaukee, in recent weeks, has received orders for five major pipe lines, calling for 174,500 tons of electrically welded steel pipe. The new lines, which have been mentioned in THE IRON AGE markets at the times of the individual lettings, are as follows: Tulsa, Okla., to Lockport, Ill., requiring 636 miles of 12-in. pipe, 70,000 tons; part of Roxana line, calling for 100 miles of 10-in. pipe, 8500 tons; El Paso natural gas line from El Paso, Tex., to Lea County, N. M., involving 205 miles of 16-in. pipe, 23,000 tons; Western Public Service line from Baxter Basin to Salt Lake City and Ogden, Utah, calling for 287 miles of 14, 16 and 18-in. pipe, 33,000 tons; and a gas line, the details of which are to be announced later, 40,000 tons. The Smith Corporation made its first shipment of pipe in September, 1927.

The Weirton Steel Co., Weirton, W. Va., has contracted with the Rust Engineering Co., Pittsburgh, for the construction of a Kathner-type normalizing furnace, employing removable bung sections over the entire length of the furnace to provide easy access to the alloy rolls. The furnace will be 84-in. wide inside and 222-ft. long. It will have a capacity of 200 tons of normalizing sheets per day, using coke oven gas for fuel. The Duraloy Co., Pittsburgh, will furnish the alloy disks and shafts.

Belgian Prices Less Firm

Exporters Still Delay Buying, But Germany Is Not Yet Able to Compete—Pig Iron Quiet

ANTWERP, BELGIUM, Dec. 7.—The number of actual transactions in iron and steel is decreasing, but with slight weakness of prices evident, there is a good volume of inquiry from buyers seeking substantial concessions. Mills, however, are fairly well booked with orders and not inclined to shade present prices. Settlement of the German lockout has not brought any serious reaction in the market, but it is estimated that the German suspension has represented a loss of about 1,600,000 tons of steel production, of which about 350,000 tons would have gone for export. Buyers for export have been delaying purchases for a possible decline in prices following the end of the lockout, but German domestic demand is heavy and German mills are not seeking export tonnage at present, so some good export business is expected to develop with Belgian and French producers.

Pig Iron.—The market is quiet and prices unchanged at 118 Belgas ($16.41) per ton for No. 3 phosphoric foundry iron, f.o.b. furnace. For export, the price is reported firm at £3 5s. ($15.80) per ton, Antwerp, and occasional sales of small lots bring £3 6s. to £3 7s. ($16.04 to $16.28) per ton. British pig iron continues a factor in Bessemer and hematite grades. The scrap market is strong and available supplies small. Open-hearth furnace steel is quoted at 103 Belgas ($14.33) and No. 1 cast scrap for foundries at 128 Belgas ($17.80).

Semi-Finished Material.—Consumers are seeking concessions, but most mills are well booked with orders for a number of weeks and show no inclination to accept lower than present prices. Billets are quoted at £5 2s. ($24.79) per ton, Antwerp, for 2-in. and £4 18s. ($23.81) per ton for 3-in. Sheet bars are firm at £5 ($24.30) per ton, f.o.b. Antwerp.

Finished Material.—Mills are well provided with tonnage and not inclined to grant concessions sought by buyers, except on certain products. Steel bar prices are slightly easier for large sizes. On desirable specifications steel bar quotations have declined to £6 2s. per ton (1.34c. per lb.), f.o.b. Antwerp and for early delivery, premiums have brought the price to £6 3s. and £6 3s. 6d. per ton (1.35c. and 1.36c. per lb.), f.o.b. Antwerp. Normal specifications of beams bring £5 2s, per ton (1.12c. per lb.). Hot rolled hoops are quoted at £6 5s. per ton (1.37c. per lb.) and cold rolled hoops at £10 15s. per ton (2.37c. per lb.), f.o.b. Antwerp.

Brown-Lipe Gear Now Part of Unit Corporation

The Unit Corporation of America, Milwaukee, has announced the acquisition of the Brown-Lipe Gear Co., Syracuse, N. Y., as the fifth manufacturing unit to come under its control, all being engaged in the production of transmission units for automobiles, motor trucks and tractors. The Milwaukee concern originally was a consolidation of the Dallman Machine & Mfg. Co., and the Obenberger Forge Co., both of Milwaukee. Later it acquired the Universal Power & Equipment Co., Detroit, and a short time ago the Fuller & Sons Co., Kalamazoo, Mich., was added.

Coes Wrench Co. Acquired By Bemis & Call

The Bemis & Call Hardware & Tool Co., Springfield, Mass., has purchased the business of the Coes Wrench Co., Worcester, Mass., and will consolidate the manufacture of this line of screw wrenches in the Springfield factory. The Coes Wrench Co. is closely affiliated with Loring Coes & Co., manufacturers of machine knives, and this business will continue at Worcester without change. In announcing the consolidation it is stated that there are brought together the largest American manufacturers of monkey wrenches and combination wrenches.

The Coes company was founded by Loring Coes, inventor of the screw wrench. With his brother, Aury G. Coes, he established a small factory in Worcester in 1840 for the manufacture of the newly invented wrench. The business grew rapidly, requiring from time to time increased facilities, until finally the present plant was erected in about 1875. J. C. McCarty, New York distributer of the Coes wrench, will handle the Bemis & Call line.

Hamilton, Ohio, Machinery Firms Are Merged

The Niles Tool Works Co., Hamilton, Ohio, subsidiary of the Niles-Bement-Pond Co., New York, and the Hoover, Owens, Rentschler Co., also of Hamilton, have been consolidated under the name of the General Machinery Corporation. The plants of the two companies adjoin and the consolidation will offer many advantages in continuing the manufacture of heavy machinery. The Niles-Bement-Pond Co. will receive common stock in the new corporation in exchange for the stock of its subsidiary.

G. A. Rentschler, president of the Hoover, Owens, Rentschler Co., will be president of the new concern; Gordon S. Rentschler, assistant to the president; William B. Mayo, chief engineer Ford Motor Co., A. A. Byerlein and Curtis T. Ziegler, vice-presidents, and Walter A. Rentschler, secretary and treasurer.

Steel Towers Support Aviation Beacons

THE steel tower shown in the accompanying illustration, which has been erected on Mount Diablo in California by the Standard Oil Co. of California, is one of a system being established on the Pacific Coast by the Airways Division, Department of Commerce. The beacon is equipped with a 10,000,000-cp. light and the 3-ft. drum is rotated by a water-tight motor through gears at 6 r.p.m., thus giving the aviator an opportunity to pick up the flash of the beacon every 10 seconds. The code letters "SD," 10 or 12 ft. in height, are hung on the tower and are outlined in Neon lights. Twenty-three of these beacons have been established between Las Vegas, N. M., and Los Angeles and another airway between Los Angeles and San Francisco will have 34 such lights.

Non-Ferrous Metal Markets

Copper Active and Firm, Tin Very Quiet and Steady, Lead and Zinc Prices Unchanged with Sales Light

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Dec. 24	Dec. 22	Dec. 21	Dec. 20	Dec. 19
Lake copper, New York	16.12½	16.12½	16.12½	16.12½	16.12½
Electrolytic copper, N. Y.*	15.75	15.75	15.75	15.75	15.75
Straits tin, spot, N. Y.	49.62½	....	49.25	49.50	49.50
Lead, New York	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis	6.35	6.35	6.35	6.35	6.35
Zinc, New York	6.70	6.70	6.70	6.70	6.70
Zinc, St. Louis	6.35	6.35	6.35	6.35	6.35

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, Dec. 24.

Copper.—Despite the holiday season, buying by both foreign and domestic consumers has been of substantial proportions during the last few days. Foreign demand has been larger than domestic, particularly from Germany. Sales on Saturday, Dec. 22, were about 6000 tons, and the total foreign sales thus far this month are estimated at about 30,000 tons. Foreign buying has included January and February principally, but considerable metal must yet be bought for those positions. Domestic buying, which has been quite substantial, has been largely for February delivery, with sales for March more liberal. Speculation is again active as regards prices, and opinion is heard in some quarters that quotations may be advanced before Jan. 1, particularly if present volume of demand continues. Prices are very firm at 16c., delivered in the Connecticut Valley, and at 16.25c., c.i.f. European ports, for electrolytic copper. The Lake copper market is moderately active, with prices steady at 16.12½c., delivered, and sales abreast of production; purchases into March are reported.

Tin.—One of the dullest markets in many weeks is the record of the week just passed. Sales totaled only slightly over 200 tons, caused partly by the general uncertainty concerning the future trend of the market and the approaching holidays. Neither dealers nor consumers are interested, but it is predicted that the latter will begin to buy when Straits tin falls under 49c. Today the market was stagnant with many offices closed or closing, and spot Straits tin was nominal at 49.62½c., New York. London prices were little changed from those reported on Dec. 18, with spot standard at £224, future standard at £223 15s. and spot Straits at £224 2s. 6d. The Singapore price today was £226 5s.

Lead.—Demand is sluggish and consumers are booked well ahead. Prices are fairly steady at 6.35c., St. Louis, and the leading interest continues to maintain its contract quotation at 6.50c., New York. London prices have declined considerably lately, so much

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	51.75c. to 52.75c.
Tin, bar	53.75c. to 54.75c.
Copper, Lake	17.00c.
Copper, electrolytic	16.75c.
Copper, casting	16.00c.
Zinc, slab	7.50c. to 8.00c.
Lead, American pig	7.50c. to 8.00c.
Lead, bar	9.50c. to 10.00c.
Antimony, Asiatic	12.00c. to 13.00c.
Aluminum No. 1 ingots for remelting (guar'nt'd over 99% pure)	25.00c. to 26.00c.
Alum. ingot, No. 12 alloy,	24.00c. to 25.00c.
Babbitt metal, commerc'l grade,	30.00c. to 40.00c.
Solder, ½ and ½	33.00c. to 34.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	54.50c.
Tin, bar	56.50c.
Copper, Lake	17.00c.
Copper, electrolytic	17.00c.
Copper, casting	16.75c.
Zinc, slab	8.00c.
Lead, American pig	7.00c. to 7.25c.
Lead, bar	9.75c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade	19.25c.
Babbitt metal, high grade	58.50c.
Solder, ½ and ½	33.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	20.25c.
Copper, hot rolled	25.00c.
Copper, cold rolled, 14 oz. and heavier	26.25c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	28.25c.
Brass Rods	18.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products are unchanged. Zinc sheets are quoted at 9.75c., base, and lead full sheets at 10.25c. to 10.50c.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	20.50c.
Copper, hot rolled	25.00c.
Zinc	9.75c.
Lead (full sheets)	10.25c. to 10.50c.
Seamless Tubes—	
High brass	25.37½c.
Copper	26.37½c.
Rods—	
High brass	18.25c.
Naval brass	20.25c.
Wire—	
Copper	17.87½c.
High brass	21.00c.
Copper in Rolls	24.00c.
Brazed Brass Tubing	28.50c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	13.75c.	15.00c.
Copper, hvy. and wire	13.50c.	14.50c.
Copper, light and bottoms	11.50c.	12.75c.
Brass, heavy	7.75c.	9.00c.
Brass, light	6.50c.	7.50c.
Hvy. machine composition	10.50c.	11.50c.
No. 1 yel. brass turnings	9.25c.	10.65c.
No. 1 red brass or compos. turnings	9.75c.	10.75c.
Lead, heavy	5.125c.	5.625c.
Lead, tea	3.75c.	4.25c.
Zinc	3.25c.	3.75c.
Sheet aluminum	13.00c.	15.00c.
Cast aluminum	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	20.50c.
Copper, hot rolled	25.00c.
Copper, cold rolled, 14 oz. and heavier	27.25c.
Zinc	10.00c.
Lead, wide	10.55c.
Seamless Tubes—	
Brass	26.87½c.
Copper	27.87½c.
Brass Rods	18.25c.
Brazed Brass Tubes	28.50c.

so that there is some prospect of Mexican lead coming into this country, and there is a possibility that this may be permitted in view of the condition of supplies, so that the trend of prices may be slightly downward in the near future.

Zinc.—Demand for prime Western is very light, but the price situation is decidedly strong, at 6.35c., East St. Louis, and 6.70c., New York, for delivery through the first quarter. Ore prices were again unchanged last week at $40, Joplin. Sales were 10,600 tons and production was 12,700 tons. Each week an advance in the ore price has been expected and it may develop soon. Producers are booked well ahead, but considerable metal must still be bought for the first quarter.

Antimony.—This market is quiet with quotations firm at 9.75c. for spot and 9.62½c. for futures, New York, duty paid.

Nickel.—Ingot and shot nickel in wholesale lots is quoted unchanged at 35c. and 36c., respectively. Electrolytic nickel in cathode form is quoted at 37c. for this year's delivery, but for 1929 it will be obtainable on the same basis as for ingot and shot nickel.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

DEC. 24.—This market is dull and prices are steady with the exception of antimony, which has been advanced. Sales of old metals are small and few in number, but prices are holding.

Prices, per lb., in carload lots: Lake copper, 16.25c.; tin, 50.50c.; lead, 6.45c.; zinc, 6.45c.; in less-than-carload lots: antimony, 11c. On old metals we quote copper wire, crucible shapes and copper clips, 12.50c.; copper bottoms, 11.25c.; red brass, 10.75c.; yellow brass, 8.25c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 27c.; tin foil, 27c.; block tin, 39c.; aluminum, 12c., all being dealers' prices for less-than-carload lots.

Reinforcing Steel

Illinois Highway Work Will Take 2250 Tons

WITH Illinois State highway work calling for 2250 tons and five junior high schools at Chicago, 1500 tons, new projects totaled more than 6700 tons. The following awards, amounting to 2100 tons, include no projects of outstanding size:

RICHMOND HILL, N. Y., 175 tons, telephone building, to Concrete Steel Co.

JERSEY CITY, 800 tons, Delaware Lackawanna & Western Railroad terminal; from Turner Construction Co., general contractor, to Jones & Laughlin Steel Corporation. About 7500 tons yet to be placed.

MARION, N. J., 115 tons, bridge work for Pennsylvania Railroad; from Arthur McMullen Co., general contractor, to McClintic-Marshall Co.

BIRMINGHAM, 180 tons, warehouse for Long-Lewis Hardware Co., to Connors Steel Co.

NEW ORLEANS, 175 tons, new building for Young Men's Gymnastic Club, to Connors Steel Co.

PITTSBURGH, 100 tons, building for Whitaker Paper Co., to Carlem Engineering Co.

CHICAGO, 125 tons, warehouse, to Concrete Engineering Co.

CHICAGO, tonnage not stated, salesroom for Studebaker Corporation, to Inland Steel Co.

LOS ANGELES, 200 tons, apartment building, 521 South Hobart Street, to unnamed interest.

OLYMPIA, WASH., 200 tons for highway work, to Northwest Steel Rolling Mills.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BALTIMORE, 800 tons, bridge over Chesapeake Bay.

WASHINGTON, 1000 tons, building for United States Bureau of Internal Revenue.

CHICAGO, 1500 tons, five junior high schools; previous bids rejected.

CHICAGO, 450 tons, Fine Arts Building.

UNIVERSITY CITY, MO., 400 tons, high school.

SPRINGFIELD, ILL., 2250 tons, highway paving and bridge projects for Illinois Highway Commission; bids opened.

HELENA, MONT., 121 tons, Missouri River bridge; bids opened.

SACRAMENTO, 113 tons, highway work in Los Angeles County; bids Dec. 26.

Railroad Equipment

Louisville & Nashville Orders 2500 Freight Cars

OUTSTANDING in a rather quiet week were orders for 2500 freight cars for the Louisville & Nashville and 100 gondola cars for the New York Central. Details of the week's business follow:

Louisville & Nashville has ordered 1200 gondola cars from Pressed Steel Car Co., 750 automobile and 250 gondola cars from Mount Vernon Car Mfg. Co. and 300 box cars from Pullman Car & Mfg. Corporation.

New York Central has ordered 100 70-ton high-side gondola cars from Merchants' Dispatch, Inc.

Chicago, Rock Island & Pacific has revised its inquiry for gas-electric cars and is now asking for bids on 14 instead of eight.

Norfolk & Western is inquiring for 10 baggage and express cars and five mail and baggage cars.

Wabash has ordered 35 single-sheathed automobile cars from American Car & Foundry Co.

Great Northern has ordered six 4-8-4 type locomotives from Baldwin Locomotive Works.

Atchison, Topeka & Santa Fe has ordered four 4-8-4 type locomotives from Baldwin Locomotive Works.

National Railways of Mexico are inquiring for three locomotive tenders.

Georgia Northern is inquiring for one Pacific type locomotive.

Coal Production Continues Heavy

Output of bituminous coal in the week ended Dec. 15 is reported by the United States Bureau of Mines at 11,024,000 net tons, a loss of 1.8 per cent from the 11,211,000 tons of the preceding week. Total production for November is given at 45,762,000 tons, which was 13 per cent above the 40,468,000 tons mined in November, 1927. It showed a drop of 4,600,000 tons, however, from the total for October, 1928, accounted for wholly by the difference in number of working days.

Anthracite production in November was reported at 7,458,000 tons, compared with 8,554,000 tons in the preceding month and with 6,854,000 tons in November, 1927.

For the elapsed portion of the calendar year, through Dec. 15, production has been 473,100,000 tons of bituminous coal and 74,115,000 tons of anthracite. Both are lower than last year, when bituminous coal was raised to the total of 499,848,000 tons, up to Dec. 15, and anthracite, 77,682,000 tons.

Pressed Metal Business Makes Substantial Gains

The Peter Smith Heater & Mfg. Co., which 14 months ago changed its name from the Peter Smith Heater Co. coincident with its purchase of a pressed metal plant at Fordson, Mich., reports a 62 per cent gain in its pressed metal business from Dec. 1, 1927, to Dec. 1, 1928, compared with the previous year.

Orders in October and November were 40 per cent above the average of several months previous. The company does pressed metal work for automobile companies and for railroads, in addition to its heater business. It reports excellent prospects for 1929, and expects to operate its plant at capacity.

Study Simplification of Copper Alloys

A committee of producers, consumers and trade paper representatives, under leadership of G. H. Clamer, Ajax Metal Co., Philadelphia, in cooperation with Non-Ferrous Ingot Metals Institute, is compiling and comparing the many specifications for copper alloys in ingot form, and collecting statistics on the amount of metal sold under each. It is hoped that this study will lead to a simplification of present practices, and the adoption of a few compositions with definite chemical limits to form the bases of trade paper quotations.

Rogers Brown & Crocker Brothers, brokers in pig iron, coke, ores and fluorspar, will hold their annual general sales conference at New York, Dec. 27, 28 and 29.

PERSONAL

HAROLD L. STEVENS has been elected president of the Danville Structural Steel Co., Danville, Pa. This is a re-rolling plant which was largely rebuilt last year, having two mills with combined capacity of about 12,000 tons a month. Old rails are transformed into reinforcing bars, tubing, fence posts and other specialties. Mr. Stevens, who was graduated at Cornell University in 1895, was most recently connected with A. Johnson & Co., importers, New York. Some years ago he was with Sweet's Steel Co., Williamsport, Pa., having built a large part of that plant. Later he was at Buffalo, with the Lackawanna Steel Co., thence going to Boston as district sales manager. When the Lackawanna plant was acquired by the Bethlehem Steel Corporation Mr. Stevens became sales manager Central Iron & Steel Co., Harrisburg, Pa.

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C. NEWMAN DAWE is in charge of the automotive division at the Detroit office of the Vanadium Corporation of America, which has recently been removed from 1355 Book Building to 2440 Book Tower. T. N. BOURKE is assistant manager of the division.

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CHARLES HARDY, of Charles Hardy, Inc., Pershing Square Building, New York, dealer in tungsten and ferro-alloys, will sail on Dec. 29 for a stay of several weeks in Europe.

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DAVID MANSON, for the last 36 years traffic manager for the Ohio Iron & Metal Co., First National Bank Building, Chicago, will retire from active business on Dec. 31. In his capacity with the Ohio company he had become one of the best known men in the scrap iron business.

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M. A. POSSONS has been appointed manager of the New Process Stove Co., division of the American Stove Co., Cleveland, succeeding the late JOHN G. WAY. Mr. Possons has been superintendent of the company and has been connected with it about 40 years.

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EDMUND P. BURKE, for the past several years identified with the sales organization of Truscon Steel Co. at Los Angeles and San Francisco, has been transferred to Youngstown, where he will be an assistant to C. I. AUTEN, vice-president.

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C. D. DALLAS, president of the Dallas Brass & Copper Co., Chicago, has been elected first vice-president and a member of the board of directors of the newly formed Republic Brass Corporation. The Dallas company and each constituent unit will continue to operate under their own names as divisions of the Republic corporation, and the Chicago company will continue the same offices and personnel.

TAYLOR ALLDERDICE has resigned as president of the National Tube Co., Pittsburgh, according to information received as THE IRON AGE goes to press. It is understood that he will be succeeded on Jan. 1 by FRED W. WATERMAN, who had charge of the construction of the Gary tube works of the National company. Mr. Allderdice became president of the company in April, 1926, following the retirement of William B. Schiller, having served as vice-president in charge of operations since 1902. He became identified with the steel industry in 1881 with the old Pittsburgh Bessemer Steel Co., Ltd., Homestead, Pa., which was later absorbed by Carnegie, Phipps & Co., Ltd., and was the nucleus of the present Homestead works of the Carnegie Steel Co. He continued this association until 1892, when, after spending a short time with the Pottsville Iron & Steel Co., Pottsville, Pa., he became associated with the National Tube Works Co. at McKeesport, Pa., in charge of the erection and operation of the new Bessemer steel works of the Monongahela Furnace Co. which had just been acquired by the National company.

TAYLOR ALLDERDICE

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MYRON C. TAYLOR, chairman of the finance committee of the United States Steel Corporation, New York, has made a gift of $1,500,000 to Cornell University for a new building for the law school at Ithaca, N. Y.

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RAY T. BAYLESS, editor of publications for the American Society for Steel Treating, and J. EDWARD DONNELLAN, secretary of the organization's recommended practice committee, will arrive in Los Angeles on Dec. 31 to aid in making arrangements for the Western Metal Congress to be held in that city on Jan. 14 to 18. They will be given a reception by the Los Angeles chapter of the society early in the new year.

WILLIAM G. WEISS, who has been manager of the mill and warehouse department of Briggs & Turivas, Chicago, since 1920, has been elected vice-president and treasurer of the Scott-Weiss Steel Co., 110 South Dearborn Street, Chicago, heretofore known as the Scott Steel Co. In joining this company, Mr. Weiss again becomes associated with CHARLES T. SCOTT, president, with whom he was closely identified in the Briggs & Turivas organization prior to the formation of the Scott company in April of this year. Mr. Weiss was formerly associated with the Whitaker-Glessner Co., Portsmouth, Ohio, and during the World War he served as chief ordnance inspector for the Government, having been located at the plants of the Colorado Fuel & Iron Co., Pueblo, Colo., and the American Sheet & Tin Plate Co., Gary, Ind. Before going with Briggs & Turivas he was identified with the purchasing department of the International Harvester Co.

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HARRY W. JONES has retired from the presidency as well as from active participation in the affairs of the Marshall & Huschart Machinery Co., Chicago. He will be succeeded by J. R. PORTER as president and general manager. FRANK SEESE continues as secretary and treasurer.

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MRS. JEAN SHASSERE has recently been made manager of the accessory department of Olney J. Dean & Co., 137 South LaSalle Street, Chicago, engineers and manufacturers of reinforcing steel.

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CARL F. WEIGEL has been appointed vice-president and general manager of the Hedges-Walsh-Weidner Co., Chattanooga, Tenn., which was recently acquired by the Combustion Corporation of America, 200 Madison Avenue, New York. Prior to the combination of the Walsh & Weidner Boiler Co. and the Casey-Hedges Co., which occurred early this year, Mr. Weigel had been for many years chief engineer of the former company. Until his recent appointment he had served as chief engineer of the combined organization.

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HUGH W. RANKIN, for the last eight years identified with the E. W. Bliss Co., Brooklyn, has been appointed Detroit representative for the Thomson Electric Welding Co., Lynn, Mass., with headquarters at 2-219 General Motors Building. Effective Jan. 17, C. W. HILL, who formerly represented the Thomson company in New England, will again handle sales in the entire New England territory as direct factory representative. He will take over the territory now being covered by the Taylor Hall Welding Corporation, Worcester, Mass.

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EDWARD T. MONROE has been appointed general purchasing agent of the Buffalo, Rochester & Pittsburgh Railway Co., with headquarters at Rochester, N. Y.

R. L. MATTHEWS has been added to the Chicago sales organization of the Wagner Electric Corporation, St. Louis. He is a graduate of Purdue University and has previously been associated with the Michigan Bell Telephone Co., the Armstrong Cork & Insulation Co. and the National Electric Products Corporation.

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GEORGE T. SINKS, until recently with the McMyler Interstate Co., Cleveland, and previously with the Industrial-Brownhoist Corporation, Bay City, Mich., has been appointed vice-president and sales manager of the Otis Engine Corporation, 130 Clinton Street, Brooklyn. EDWIN F. DALEY, who is vice-president and general manager of the company, was, until Nov. 1, chief mechanical engineer for the Morse Dry Dock & Repair Co., Brooklyn, and previously he was for a number of years assistant superintendent of motive power and equipment and director of personnel on the Delaware, Lackawanna & Western Railroad.

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GEORGE A. ORROK, consulting engineer, New York, has removed his offices from 124 East Fifteenth Street and 17 Battery Place to 52 Vanderbilt Avenue.

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FRED O. SMITH, secretary and manager of purchases for the Vulcan Iron Works, Wilkes-Barre, Pa., has been elected a vice-president of that company. He is also a director of the company and vice-president and a director of the Wilkes-Barre Iron Mfg. Co., Wilkes-Barre.

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WILLIAM MILLER, who has been attached to the Philadelphia office, Jones & Laughlin Steel Corporation, Pittsburgh, has been appointed district sales manager in charge of the Atlanta office, which is to be opened in the Healey Building on Jan. 1. T. G. Roberts, formerly in the Washington office, has been transferred to the Philadelphia office as assistant district sales manager. BENJAMIN P. TOLES has been appointed Canadian district sales manager, with headquarters in the Toronto Star Building, Toronto, Ont., of the Jones & Laughlin Steel Products Co., a subsidiary of the Jones & Laughlin Steel Corporation. Mr. Toles' appointment and the opening of this office are effective Jan. 1.

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ABRAM F. MYERS, chairman of the Federal Trade Commission, has resigned to accept a position with a motion picture organization. At the request of the President, Mr. Myers will continue with the commission until it disposes of some of its pending cases.

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W. M. JENSEN has been appointed Pacific Coast manager Pittsburgh Steel Co., with headquarters in San Francisco. Mr. Jensen for many years was associated with the late A. C. RULOFSON, who represented the company on the Pacific Coast.

Obituary

WILLIAM C. JOHNSON, president of the William C. Johnson & Sons Machinery Co., St. Louis, died at his home in that city last week, aged 82 years. He was born at New Brunswick, N. J., and went to St. Louis when he was 17 years old, where he entered the machinery business. He established his own firm in 1904.

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MURRAY MORRIS DUNCAN, one of the most prominent figures in the Lake Superior iron ore industry, with which he was associated for 30 years, and vice-president and director and former general manager of the mines of the Cleveland-Cliffs Iron Co., died Dec. 18, at his home in Ishpeming, Mich., after a long illness. He was 70 years of age. Mr. Duncan was born at Washington in 1858 and was graduated from Lehigh University in 1880. His first employment was with the Cambria Iron Co., Johnstown, Pa., as assistant chemist. In 1897, after experience with several Tennessee companies, he became associated with the Cleveland-Cliffs company as agent of its mines at Ishpeming. In 1908 he was elected a director of the company succeeding the late Peter White who died that year. He was made vice-president and general manager of the mines in 1916 and retained the active management of the company's iron-mining properties until poor health necessitated his retirement. He was a member of the American Institute of Mining & Metallurgical Engineers and of the Lake Superior Mining Institute having served as president of the latter organization.

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CHARLES J. RICHARDS, president-treasurer Badger-Packard Machinery Co., machine-tool jobber, and president Richards Machinery Co., manufacturing machinist, Milwaukee, died Dec. 17, after a three weeks' illness. He was born at Manitowoc, Wis., in 1876 and established the machine shop in Milwaukee in 1906, becoming interested in the Badger-Packard business in 1922.

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FRANK H. PAGE, president National Equipment Co., Springfield, Mass., maker of candy-making machinery, died on Dec. 19 at his home in that city, aged 64 years. He was born at Holyoke, Mass., and was graduated from the Massachusetts Institute of Technology. He began the manufacture of confectioners' machinery at Springfield in 1891.

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HARRY D. PIERCE, former president of the National Sewing Machine Co., Chicago, was drowned Dec. 17 at Palm Beach, Fla.

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EDWIN B. ROBINSON, assistant order manager American Steel & Wire Co., Worcester, Mass., died at his home in that city on Dec. 20. He had been associated with the Worcester company for 27 years, beginning in the shops and working up to his last position.

Combustion Engineers to Discuss Steel Subjects

A two-day conference of the combustion engineering division of the Association of Iron and Steel Electrical Engineers will be held on Jan. 23 at the William Penn Hotel, Pittsburgh, and on Jan. 24 in Carnegie Library, Duquesne, Pa. Subjects at the first day's session will be "The Isley Open-Hearth Furnaces;" "The Use of Heat Resisting Alloy Steel in the Steel Plant;" "Furnace Bindings;" "Fuel Utilization Practices in Europe;" "Employees Training for Combustion Work and Cooperation with Other Departments." The second day's session will be devoted to a symposium on gas cleaning and air conditioning.

Pittsburgh district section, Association of Iron and Steel Electrical Engineers will have an all day symposium covering lubrication at the William Penn Hotel, Pittsburgh, Saturday, Jan. 5, by L. P. Tyler, Vacuum Oil Co., Pittsburgh; C. W. Byden, DeLaval Separator Co., New York, and C. O. Norstrum, Keystone Lubricating Co., Philadelphia.

Two Companies to Make Hollow-Rolled Bars

Announcement has been made by the Old Dominion Iron & Steel Works, Belle Isle, Richmond, Va., that a contract has been entered into with the Burden Iron Co., Troy, N. Y., by which that company has the exclusive right—outside of the Old Dominion Iron & Steel Works, Inc.—to manufacture seamless hollow-rolled staybolt iron bars and bolts, under patent rights owned by the Old Dominion company. "Hence," says the announcement, "buyers of this product will have the advantage of a competitive market, the choice of two brands of iron and ample production capacity."

Threading Heads and Taps

A comprehensive catalog of 96 pages has been issued by the Landis Machine Co., Waynesboro, Pa., covering heads, chasers, grinders and taps for thread cutting. Illustrations show clearances, while the tabular matter in the book is such as to aid in selection of equipment for specific purposes.

Davison Coke & Iron Co., which bought the Neville furnace, Neville Island, Pittsburgh, from the American Steel & Wire Co., has plans on paper for another blast furnace on the land which it acquired at the time of the furnace purchase, but it is officially stated that the construction of another stack depends upon future conditions. Building of two more batteries of by-product coke ovens, plans for which have been worked out, also is a future rather than an immediate possibility.

Machinery Markets and News of the Works

Sales at High Peak in 1928

Machine Tool Business Best Since 1919 for Many Companies and Largest Since War for Others

MACHINE tool business in 1928 was the largest since 1919 for many companies and for some it was the best year since the war. Even war-time records have been equalled or excelled in some districts and by some builders. The gain over 1927 is fully 25 to 50 per cent in all cases.

The improvement in sales in the year is traceable largely to three sources: automobile, aircraft and agricultural implement and machinery. In addition, replacement of obsolete equipment in the general industrial field was far above the average of recent years. Railroads, however, were not conspicuously large buyers.

The outlook for the first quarter of 1929 is regarded most hopefully. Inquiries are numerous, and, while there has been some falling off in the volume of orders in December, a renewed wave of buying is believed to be in the making, and it is expected that it will get under way early in the new year. Automobile manufacturers are expected to continue as important buyers, while needs for aircraft manufacture are growing.

The Curtiss Aeroplane & Motor Co., Buffalo, continues to buy for a new plant addition. Its purchases, while not as heavy as those recently made by the Wright Aeronautical Corporation, will probably exceed $200,000. A prospective buyer of tools is the American Cirrus Engines, Inc., temporarily located at 84 William Street, New York, which has taken over a plant at Belleville, N. J., for the manufacture under license of the Cirrus (British) airplane engine.

The Chicago & North Western Railroad is preparing a list which includes about $140,000 worth of machine tools.

New York

NEW YORK, Dec. 24.—Nearly all machine tool sellers in this market will close their 1928 sales records with the comforting thought that the past year has been the best since the war. For a few companies the 1928 sales may total in dollars more than in any of the war years. There has been some falling off in orders in the past week, but inquiries are numerous and promise a good first quarter. The Curtiss Aeroplane & Motor Co., Buffalo, has continued the placing of orders for equipping a plant addition. It has introduced an innovation in buying in that salesmen and engineers representing various types of machines are called in conference in groups and each company is asked to state its proposition in the presence of competitors, especially as regards production claims.

A new airplane engine manufacturer which is expected to come into the market soon for machine tools is American Cirrus Engines, Inc., which has taken over a plant at 752 Washington Avenue, Belleville, N. J., for production of Cirrus (British) engines under license. Temporary offices are at 84 William Street, New York. G. G. De Witt is purchasing agent and A. G. Lloyd is production manager. A few tools have been bought by the Wood Newspaper Machine Corporation, Plainfield, N. J.

Niles-Bement-Pond Co. has sold in the past week a wheel press, steam hammer, boring mill, four radial drills, two grinders and an upright drilling machine. Pratt & Whitney division sold three jig borers, four engine lathes, one vertical shaper, two thread millers and a centering machine.

Bids are being asked by Delaware, Lackawanna & Western Railroad Co., 90 West Street, New York, for initial work in connection with electrification of suburban lines in New Jersey, to cost about $10,000,000. A steam-operated electric generating plant is under consideration near Kearny, N. J., to cost about $4,000,000 additional. Engineering department of company is in charge.

Empire Architectural Iron Works, Randall Avenue and Truxton Street, New York, has purchased additional property and is reported planning expansion.

Toy Products Mfg. Co., 465 West Broadway, New York, has leased space in building at 585 Broadway, totaling about 20,000 sq. ft. floor space, for expansion.

American Aeronautical Corporation, 730 Fifth Avenue, New York, is considering new aircraft manufacturing plant at Bayshore, L. I., for parts and assembling, to cost more than $50,000 with equipment.

Claude Neon Lights, Inc., 50 East Forty-second Street, New York, manufacturer of electric displays, etc., with main plant at Long Island City, is arranging for increase in capital from 100,000 to 3,000,000 shares of stock, disposing of 1,000,000 new shares at once, part of proceeds to be used for expansion.

Anheuser-Busch Ice & Cold Storage Co., 979 Brook Avenue, New York, has awarded general contract to Equity Construction Co., 25 West Forty-third Street, New York, for new two-story plant to cost about $150,000 with equipment.

Lancia Motors of America, Inc., 140 West Fifty-seventh Street, New York, affiliated with Lancia Automobile Co., Turin, Italy, has arranged for sale of stock to total $2,200,000, part of proceeds to be used for establishment of plant. Company has acquired factory on 14 acres at Poughkeepsie, N. Y., with 129,000 sq. ft. floor space, for output of 3000 cars during coming year.

Manhattan Electrical Supply Co., 11 Park Place, New York, has acquired United States Manganese Corporation, New York, recently formed with capital of $1,000,000, and will consolidate with organization. About 8400 acres of manganese and mineral properties in Augusta County, Va., is secured through purchase, and Manhattan company is said to be planning installation of plant, with operating, storage and distributing facilities.

Shampan & Shampan, 188 Montague Street, Brooklyn, architects, have plans for two and three-story automobile service, repair and garage building, 100 x 250 ft., to cost over $200,000 with equipment.

Perryman Electric Co., Thirtieth Street and Fourth Place, North Bergen, N. J., has awarded general contract to Bonanno Brothers, 1827 Bergen Turnpike, for three-story radio equipment manufacturing plant, 80 x 200 ft., to cost about $80,000 with equipment.

Liberty Auto Radiator Co., 3218 Hudson Boulevard, Jersey City, N. J., will take bids at once for new two-story plant unit, 25 x 100 ft., to cost about $30,000 with equipment. Flagg & Stades, 665 Newark Avenue, are architects.

Glo-Lite Corporation of America, Inc., 560 Broad Street, Newark, N. J., manufacturer of electric signs and displays, with plant at Irvington, has plans for factory unit at Harrison, N. J., to cost more than $40,000 with equipment.

American Cirrus Engines, Inc., care of Col. R. Potter Campbell, 62 Montrose

Avenue, South Orange, N. J., president, recently organized to manufacture a British type aircraft motor, has leased factory on Washington Avenue, Belleville, N. J., totaling about 38,000 sq. ft. floor space, for parts and assembling plant.

L. & K. Ice Corporation, 19 West Forty-fourth Street, New York, has plans for artificial ice plant at Newark, consisting of three one-story units, 75 x 132 ft., 73 x 81 ft., and machine division, 25 x 96 ft., to cost more than $225,000 with machinery. Frank Grad, 1023 Broad Street, Newark, is architect.

Brown Instrument Co., Philadelphia, maker of recording instruments, has removed New York office from 50 Church Street to larger quarters at 1502 Roebling Building, 117 Liberty Street.

New England

BOSTON, Dec. 24.—Machine tool business fell off the past week. Based on active negotiations involving considerable equipment, the trade is confident that good business will be closed during January and February. Several New England machine tool builders are still operating night shifts, and delivery dates on many types of equipment are extended into March and April. Small tool demand continues active.

Standard Foundry Co., Southgate Place, Worcester, Mass., will soon start work on a two-story addition, 35 x 41 ft.

Plans have been made by Bradford Hat Co., Haverhill, Mass., to replace a two-story machine shop recently destroyed by fire.

Equipment of Edward Wilkinson & Co., Inc., 253 Georgia Avenue, Providence, R. I., including a small number of metal-working tools, will be sold at auction Jan. 3.

Lockwood Greene Engineers, Inc., 24 Federal Street, Boston, will close bids Dec. 28 on a one-story and basement machine shop addition, 130 x 123 ft., for New Departure Mfg. Co., Bristol, Conn.

Henry & Richard, 112 West Street, Boston, architects, have plans for a power house, 45 x 60 ft., at State Normal School, Bridgewater, Mass. Pason Smith, 209 State House, Boston, commissioner, is in charge.

Prentice Mfg. Co., Kensington, R. I., manufacturer of buckles, has started work on a three-story plant, 40 x 100 ft., and a three-story unit, 30 x 70 ft.

Crane Co., Bridgeport, Conn., has started work on a plant, 120 x 600 ft., and a three-story cupola and elevator shaft, 32 x 45 ft.

B. F. Sturtevant Co., Boston, manufacturer of blowers, has moved its downtown office to 89 Broad Street.

Narragansett Electric Co., Providence, is arranging fund of more than $1,400,000 for extensions and improvements next year. About $500,000 will be used for expansion and betterments at plant on South Street, and about like sum for new power substation in downtown district.

Uncas Mfg. Co., 85 Sprague Street, Providence, has rescinded former contract and made general award to Bowerman Brothers, 70 Bath Street, for two-story addition and improvements to jewelry manufacturing plant, to cost about $50,000 with equipment.

Gamewell Co., Newton, Mass., manufacturer of fire alarm equipment, has purchased plant and business of Holtzer Cabot Electric Co., 125 Amory Street, Boston, manufacturer of signal systems and equipment, and will operate as a division. Purchasing company is authorizing increase in capital from 67,500 to 150,000 shares of stock, part of proceeds to be used for expansion.

C. H. Lockwood, 171 Westminster Street, Providence, architect, has plans for two-story jewelry manufacturing plant for local company, name temporarily withheld, to cost about $45,000.

Sikorsky Mfg. Corporation, College Point, L. I., manufacturer of aircraft and parts, has awarded general contract to W. J. Shaughnessy, Jr., Inc., 119 Fairfield Avenue, Bridgeport, Conn., for new plant at Stratford, Conn., to cost over $400,000 with machinery. Fletcher-Thompson, Inc., 542 Fairfield Avenue, Bridgeport, is architect and engineer.

Rhode Island Malleable Iron Works, Hillsgrove, R. I., has purchased capital stock of Rhode Island Fittings Co., Providence, R. I. Malleable Iron Works is a jobbing foundry, making all kinds of castings and specializing in manufacture of pipe union castings. Fittings company will continue to be operated as separate unit, and will have same officers as Malleable Iron Works.

The Crane Market

VERY little new inquiry for either overhead or locomotive cranes has developed in the past week. A fair number of orders is pending, but prospective buyers are slow to place business. A recent outstanding purchase of overhead equipment was made by the International Paper Co., 11 East Forty-second Street, New York, which closed on 18 hand-power and electric cranes for shipment to Dalhousie, N. B.

In the Pittsburgh district the A. M. Byers Co. has asked for 19 overhead cranes, one slab charger and one cupola charger for its new Ambridge, Pa., plant, as follows: Two 10-ton, 65-ft. and 80-ft. spans; six 15-ton, 40, 90 and 120-ft. spans; three 25-ton, 45, 80 and 90-ft. spans; two 20-ton, 85-ft. spans; four 35-ton, 40, 70, 85 and 100-ft. spans; one 5-ton, 25-ft. span, a 2½-ton slab charger and a cupola charger. The Youngstown Sheet & Tube Co. has added one more crane to its recent list of 11 for Indiana Harbor.

Among recent purchases are:

International Paper Co., 11 East Forty-second Street, New York, seven 16-ton, two 10-ton and two 3-ton hand-power cranes from a Canadian builder and one 35-ton, three 17½-ton and three 2-ton electric cranes reported from an American builder in Canada, all for shipment to Dalhousie, N. B.

American Enka Corporation, New York, 20-ton, 42-ft. span, 1-motor and a 10-ton 40-ft. span hand-power crane for Asheville, S. C., from Box Crane & Hoist Corporation.

N. P. Nelson Mfg. Co., Passaic, N. J., 7½-ton, 39-ft. span hand-power crane from Box Crane & Hoist Corporation.

Powell & Minnock Co., Coeymans, N. Y., 2½-ton, 30-ft. span, single I beam, 1-motor crane from Chisholm & Moore Mfg. Co.

Moses Ehrlich Iron & Metal Co., Springfield, Mass., used 7½-ton Brownhoist crawl-tread crane reported from Industrial-Brownhoist Corporation.

David Hummell Building Co., Cincinnati, 20-ton, 64-ft. span overhead crane from Bedford Foundry & Machine Co.

Pittsburgh Forgings Co., Pittsburgh, 10-ton, 60-ft. span crane from Shaw Electric Crane Co.

Philadelphia

PHILADELPHIA, Dec. 24.—Contract has been let by Brinton Foundry Co., Paul and Van Dyke Streets, Philadelphia, manufacturer of iron castings, to Davidson & Lavery, 4438 Leiper Street, for one-story addition, to cost about $20,000 with equipment.

Automatic Temperature Control Co., 2500 North Lawrence Street, Philadelphia, has purchased property, 58 x 200 ft., at Germantown, and is said to be planning construction of new plant to occupy entire site.

Philadelphia Air Terminal, Inc., F. B. Biddle, secretary and treasurer, Morris Building, Philadelphia, recently formed by Mr. Biddle, Andrew S. Webb, president S. B. & B. W. Fleisher, Inc., Twenty-fifth and Reed Streets, and associates, has engaged B. Russell Shaw Co., Inc., 810 Olive Street, St. Louis, engineer, to prepare plans for new airport at South Philadelphia, including hangars, repair and reconditioning shops, oil storage and distributing buildings, project to cost about $2,000,000. Bids will soon be asked on general contract.

Biddle-Garrett Co., Philadelphia, recently formed by Fenton H. Middleton, 860 North Fifth Street, and associates, plans operation of local plant to manufacture iron and steel specialties, including automobile parts. Harry Hershey, 1233 Lehigh Avenue, is interested in new organization.

Pennsylvania Flexible Metallic Tubing Co., Broad and Race Streets, Philadelphia, has awarded general contract to E. H. Keefer & Son, 1321 Rodman Street, for two-story and basement addition, 45 x 125 ft., to cost more than $50,000 with equipment. William H. Cookman, 420 West Price Street, is architect.

Plibrico Jointless Firebrick Co., New York Avenue, Trenton, N. J., manufacturer of firebrick and other refractories, has awarded general contract to Nicholson Co., 247 Park Avenue, New York, for addition to cost about $100,000 with equipment.

Delaware Electric Power Co., Wilmington, Del., recently formed to take over and operate Delaware Power & Light Co., is disposing of bond issue of $8,000,000, part of proceeds to be used for expansion and improvement in power facilities. Company is affiliated with United Gas Improvement Co., 1401 Arch Street, Philadelphia. T. W. Wilson is president.

American Horseshoe Co., Phillipsburg, N. J., has been acquired by Phoenix Horse Shoe Co., Joliet, Ill., recent purchaser of Bryden-Neverslip Co., Catasauqua, Pa., manufacturer of kindred products, and will be included in merger with that company. American company will retain its real estate and equipment, and plans to convert plant for another line of iron and steel production. E. R. Yarnelle is president of last noted company.

Department of Property and Supplies, Capitol Building, Harrisburg, Pa., is reported planning new steam-operated electric power plant at Capitol Park, to cost

more than $850,000 with equipment. B. E. Taylor is in charge.

McClintic-Marshall Co., Pittsburgh, has acquired local plant and property of Pottstown Iron Co., totaling about 30 acres, for expansion.

Cincinnati

CINCINNATI, Dec. 24.—The temporary lull in buying incident to the holidays and to the annual inventory period is affecting sales of local machine tool builders, who report that business is being booked in considerably less volume than in November. Inquiries, however, are numerous and indicate a resumption of purchasing shortly after Jan. 1.

An appraisal of local machine tool sales in the past 12 months shows a substantial and unexpected gain over 1927. With hardly an exception, leading machine tool companies report an increase in business ranging from 25 to 50 per cent, the gain over 1927 probably averaging from 30 to 35 per cent. With such a spectacular betterment of conditions, it is not surprising that many machine tool builders did the largest volume of business since 1919.

The improvement in sales the past year can be traced largely to the automobile industry, agricultural implement makers and the airplane industry. Automobile manufacturers bought equipment in much heavier volume than in 1927, and in several cases machine tool companies state that almost all of their gain in business has come from the Detroit district. The tooling up of the agricultural implement plants throughout the country contributed substantially to the bookings of machine tool builders, while the purchase of tools by companies manufacturing airplanes and airplane engines was an important factor in stimulating activities. In addition, replacement of obsolete equipment by companies in the general industrial field was above the average of recent years.

Foreign business, especially from Europe, was in slightly larger volume than in 1927, but in the main was only a small percentage of the total bookings. Machine tool executives are of the opinion that little improvement in that direction can be expected the coming year. Railroad buying was disappointing and there is no sign that carriers will increase tool purchases to an appreciable extent in 1929.

Machine tool manufacturers are looking forward to a prosperous first quarter and buying of new equipment is expected to get under way before the middle of January. It is believed that the automobile industry will continue a prominent factor in the market.

Airport Commission, Columbus, Ohio, F. F. Green, A. I. O. U. Building, chairman, has plans for municipal airport at James Pike and Pennsylvania Railroad, to include hangars, repair and reconditioning shops and other units, to cost $850,000. R. H. Simpson, City Hall., is engineer.

Electric Auto-Lite Co., Toledo, Ohio, manufacturer of automobile electric lighting and starting equipment, has secured control of Columbus Auto Parts Co., Columbus, Ohio, and will operate as subsidiary for manufacture of tie rods, drag links and other mechanisms for automobile steering wheels. Columbus company is disposing of stock issue to total $1,525,000, part of fund to be used for expansion.

Aeronautical Corporation of America, Inc., Cincinnati, recently organized, has engaged H. Neilson Jackson, Mercantile Library Building, architect, to prepare plans for plant at municipal airport to manufacture airplanes. Initial unit will be one-story, 100 x 300 ft., for parts and assembling, to cost more than $85,000 with equipment. Bids will be asked on general contract in about 30 days.

Shannon Spring Bed. Mfg. Co., 659 South Ninth Street, Louisville, has acquired property at Thirteenth Street and Garfield Avenue, formerly occupied by Mercury Body Co., and will remodel for new plant.

Kentucky Color & Chemical Co., Louisville, has purchased 10 acres at Kearny, N. J., for new plant to cost over $200,000 with machinery. A machine shop will be installed.

Ebinger Sanitary Mfg. Co., 184 Lucas Street, Columbus, Ohio, manufacturer of plumbing equipment and supplies, has awarded general contract to E. Elford & Son, 555 Park Street, South, for one-story addition to cost about $40,000 with equipment.

Pittsburgh

PITTSBURGH, Dec. 24.—Machine tool business this month has made a relatively good showing for the final month of the year. As a whole, 1928 has been better in sales and profits than 1927, and there is much optimism over early 1929 prospects.

One of Pittsburgh's district steel companies is expected to place a good-sized list of tools soon after the turn of the new year and the Westinghouse Electric & Mfg. Co. is expected to have a heavy first quarter list, since it bought rather sparingly against its list for this quarter. A. M. Byers Co., having asked for prices on cranes for its new plant at Ambridge, Pa., is expected shortly to inquire for tools for a new machine shop.

Plans are being prepared by Kerotest Mfg. Co., 2525 Liberty Avenue, Pittsburgh, manufacturer of steel and brass valves, etc., for three-story addition, including machine shop, to cost about $100,000 with equipment. J. T. Steen & Son, Vandergrift Building, are architects.

Hamilton Pump Co., Pittsburgh, recently organized by E. A. Hamilton, 106 Gladstone Road, and associates, plans operation of local plant to manufacture centrifugal and other pumping machinery and parts. C. G. Lane, Jr., 1415 Park Building, will be an official of new company.

Wheeling Steel Co., Wheeling, W. Va., is planning construction of factory branch and distributing plant at Rensselaer, N. Y., for Eastern base, to cost about $100,000 with equipment.

Commercial Body Co., Bluefield, W. Va., recently formed by B. W. Curry, 912 College Street, and associates, will operate local plant for manufacture of truck and other commercial automobile bodies.

Franklin Creek Oil Works, Franklin, Pa., operated by L. Sonneborn Sons, Inc., 114 Fifth Avenue, New York, is reported planning expansion and improvements at local refinery, with installation of stills, storage and distributing facilities to double present capacity, continuing expansion program started several months ago, to cost more than $90,000.

Board of Education, Beaver Falls, Pa., contemplates installation of manual training equipment in new multi-story high school, to cost about $250,000, for which bids will soon be asked by Carlisle & Sharrer, Martin Building, Pittsburgh, architects.

Board of Education, Administration Building, Pittsburgh, will receive bids until Jan. 3 for steel lockers, suit storage lockers, and other equipment. George W. Gerwig is secretary.

Chicago

CHICAGO, Dec. 24.—Purchases of machine tools are confined largely to odd pieces of equipment. The market does not lack inquiry, but it is evident that much of this will be held over until after Jan. 1.

Whiting Corporation, Harvey, Ill., is moving slowly in tabulating bids against its list. Buda Co., Harvey, Ill., has purchased a few items and bids have been made on the Austin Mfg. Co.'s list. Here and there some indication is given of future railroad purchases. Chicago & North Western is preparing a 1929 budget which includes $140,000 worth of machine tools. An electrical appliance manufacturer in Milwaukee has ordered a press.

Hayes Body Corporation, Ionia, Mich., will spend $170,000 for plant improvements and additions.

Hallis & Mead, sheet metal workers, 309 Twenty-fourth Street, Rock Island, Ill., have purchased adjoining property for expansion.

Scott Steel Co., 110 South Dearborn Street, Chicago, has changed its name to Scott-Weiss Steel Co. William G. Weiss, formerly manager of mill and warehouse department of Briggs & Turivas, Chicago, is vice-president and treasurer.

Hisey-Wolf Machine Co., Cincinnati, maker of portable electric machine tools, has opened branch office at 210 Machinery Hall, 549 West Washington Boulevard, Chicago, in charge of Roy D. Haworth. Complete stock of company's products will be carried.

Atlas-Chicago Co., Chicago, has been sold and transferred to Grolan Mfg. Co., Dayton, Ohio, and will hereafter be known as Atlas Duo-Rail Co., division of Grolan Mfg. Co.

Storkline Furniture Corporation, 4400 West Twenty-sixth Street, Chicago, has asked bids on general contract for one and two-story addition, to cost about $160,000 with equipment. R. B. Kurzon, 105 West Monroe Street, is architect.

Central Illinois Public Service Co., Public Service Building, Springfield, Ill., is disposing of bond issue of $5,700,000, part of fund to be used for extensions in power plants and other utilities, including transmission lines. Bids will soon be asked for one-story ice-manufacturing plant at Cairo, Ill., to cost about $60,000 with equipment.

Pines Winterfront Co., 404-24 North Sacramento Street, Chicago, manufacturer of automatic radiator shutters for automobiles, etc., has awarded general contract to Scown Building Co., 36 West Randolph Street, for two-story plant to cost more than $800,000 with equipment.

Federal Sign Co., 1215 Nicollet Avenue, Minneapolis, Minn., manufacturer of electric signs and displays, has begun superstructure for two-story and basement plant at 2014 University Avenue, S. E., to cost close to $40,000 with equipment. Larson & McLaren, Baker Building, are architects.

St. Louis

ST. LOUIS, Dec. 24.—Gaus-Boyer Mfg. Co., St. Louis, care of Harry G. Gaus, Clinton and Main Streets, recently formed with capital of $50,000, plans establishment of new plant to manufacture refrigerators, equipment to cost about $25,000.

South Side Machine Co., 4016 Nebraska Street, St. Louis, has plans for one-story plant, to cost about $40,000 with equipment. Leonard Haeger, 3844 Utah Place, is architect.

Oklahoma Steel Castings Co., 1200 North Lewis Street, Tulsa, Okla., has begun construction of one-story foundry unit for which general contract recently was let to J. R. Forner Co., Ritz Building.

Root Refining Co., El Dorado, Ark., has been organized to take over and expand Root Refineries, Inc., now completing local gasoline refinery. New company has arranged for stock issue to total $1,545,000, part of fund to be used for plant completion and other expansion. D. P. Hamilton is vice-president.

St. Louis Smelting & Refining Co., 722 Chestnut Street, St. Louis, has purchased properties of Schulte Mining Co., Fredericktown, Mo., including lead deposits, and plans development of latter properties, including refining facilities.

City Council, Kirksville, Mo., has plans for municipal electric light and power plant, to cost more than $200,000 with equipment. Black & Veatch, Mutual Building, Kansas City, Mo., are consulting engineers.

Buffalo

BUFFALO, Dec. 24.—Bids will be received by Board of Education, Genesee Building, Buffalo, until Jan. 10 for construction of Burgard vocational school, to cost more than $750,000 with equipment.

Harrison Radiator Corporation, Walnut Street, Lockport, N. Y., has awarded general contract to John W. Cowper Co., M. & T. Building, for three-story addition to cost about $130,000 with equipment. J. R. Tyler, Bank of Rochester Building, Rochester, N. Y., is architect.

Dry Ice Corporation of America, Inc., 50 East Forty-second Street, New York, manufacturer of freezing material made with carbon dioxide, plans construction of new plant at Niagara Falls, N. Y., to cost over $100,000 with machinery.

J. P. Devine Co., 1372 Clinton Street, Buffalo, manufacturer of vacuum drying apparatus, chemical machinery, etc., recently acquired by Mount Vernon Car Mfg. Co., Mount Vernon, Ill., is having plans drawn for new plant at Mount Vernon, to cost over $350,000 with equipment.

Hooker Electro-Chemical Co., Buffalo Avenue and Union Street, Niagara Falls, N. Y., is arranging bond issue of $1,500,000, part of proceeds to be used for expansion, including new plant at Tacoma, Wash., on which work has been started; latter works will cost over $1,000,000 with machinery.

Board of Education, Penn Yan, N. Y., plans installation of manual training equipment in new junior high school to cost $425,000, for which bids will be asked soon on general contract. Carl Ade, 89 East Avenue, Rochester, N. Y., is architect.

Charles Griffin, 24 Garson Avenue, Rochester, and associates, plan operation of plant in name of Griffin & Yengst Metal Finishing Co., recently organized to manufacture metal specialties. Andres Yengst, 50 Mount Vernon Avenue, will also be an official of new company.

Milwaukee

MILWAUKEE, Dec. 24.—Perhaps not since the war has there been a holiday season in which production of machine tools has held up to the extent of this year. Most shops are far behind on deliveries, with buyers exerting pressure to procure shipments. New buying, while not as brisk as in recent weeks, is above normal for this season, and fresh inquiry is excellent.

Nash Motors Co., Kenosha, Wis., has broken ground for a new $400,000 foundry to be devoted exclusively to casting cylinder blocks, heretofore provided under contract with an independent foundry at Racine, Wis. New foundry is in addition to other extensions being made at Kenosha, Racine and Milwaukee divisions, body plant at Milwaukee, and body stock mills at Pine Bluff, Ark., which call for an expenditure of over $3,000,000.

Hamilton Aero Mfg. Co., 60 Keefe Avenue, Milwaukee, manufacturer of aluminum alloy and laminated wood propellers for aircraft, has acquired factory at Bremen Street and Concordia Avenue, affording 68,000 sq. ft., or four times the present capacity. Production schedule for 1929 calls for 50 propellers daily. Hamilton Metalplane Co., 530 Park Street, a separate corporation manufacturing complete aircraft, also is planning an increase in output, requiring additional equipment. Thomas F. Hamilton is president and general manager of both corporations.

Eastman Mfg. Co., 1002 North Eleventh Street, Manitowoc, Wis., will be ready for bids Jan. 10 for construction of a one-story shop addition, 60 x 66 ft. Company manufactures hose couplings.

Merrill Buick Sales Co., Merrill, Wis., has placed general contract with Joseph Doheney, local, for a two-story sales and service building, 76 x 85 ft., with basement. Machine shop area will be about 50 x 76 ft. With equipment it will cost about $55,000.

W. W. Oeflein, Inc., 110 East Wisconsin Avenue, Milwaukee, has contract to build a one-story machine and assembling shop, 200 x 600 ft., as one of three new buildings of tractor division of main works of Allis-Chalmers Mfg. Co., West Allis, Milwaukee.

Public Utilities Commission, Manitowoc, Wis., expects to ask bids about Feb. 1 for an addition to municipal steam generating plant to cost $250,000. Plans are being made by M. Schroeder, consulting engineer. A. H. Zander is city clerk.

Oneida Gas Co., Rhinelander, Wis., has been granted franchise by city of Merrill, Wis., to build a gas plant and distribution system and is now completing plans, to be ready for bidders about Feb. 1. An investment of $75,000 is contemplated.

Master Lock Co., 918-926 Juneau Avenue, Milwaukee, manufacturer of pad locks exclusively, has taken additional space in its present building and is in market for equipment to provide 50 per cent increase in production.

Indiana

INDIANAPOLIS, Dec. 24.—Pacific Electric Mfg. Co., 5815 Third Street, San Francisco, manufacturer of electric switches, etc., is planning branch factory at Gary, to cost more than $50,000 with equipment. I. M. Cohen, 738 Broadway, Gary, is architect.

Bond Electric Corporation, 1120 Division Street, Indianapolis, manufacturer of storage batteries, flashlights, etc., with headquarters at Jersey City, N. J., formerly known as Yale Electric Co., has leased part of plant at 1129 East Twenty-second Street, Indianapolis, for new factory for daily output of about 250 battery units. Arthur Kane is factory manager.

C. R. Wermuth, 1036 St. Marys Street, Fort Wayne, has begun construction of one-story machine shop, 75 x 108 ft., to cost about $25,000 with equipment. Pohlmeyer & Pohlmeyer, Central Building, are architects.

Standard Oil Co., 910 South Michigan Avenue, Chicago, has awarded general contract to Hay-Weaver Co., 2410 South Main Street, South Bend, for two-story storage and distributing plant at South Bend, to cost about $75,000 with equipment.

Chrysler Motor Corporation, Detroit, has authorized one-story addition to branch plant at Newcastle, Ind., 80 x 85 ft., to cost about $35,000 with equipment.

Knefler-Bates Mfg. Co., 165 Palmer Street, Indianapolis, plans rebuilding part of four-story corn products plant destroyed by fire Dec. 15, with loss reported over $200,000 including equipment.

Cleveland

CLEVELAND, Dec. 24.—Machine tool business fell off the past week which was not unusual with the holidays near at hand. The only activity among dealers was the sale of a few single tools. Some prospective business will go over until the new year. Deliveries are so far extended on some lines that they have become an important factor and some manufacturers are losing orders to competitors who can make quicker shipments. While not much business is expected during the remainder of the year, the trade looks for a good volume of sales during January.

Continental Carbon Co., 13904 Lorain Avenue, Cleveland, has awarded general contract to David Gilchrist, 97 East Grand Avenue, Berea, Ohio, for two two-story additions, to cost more than $75,000 with equipment.

Lake Erie Metal Products Co., Dunham Road, Cleveland, is having plans drawn by Henry W. Griene, Engineers' Building, architect and engineer, for new one and two-story plant, 75 x 100 ft., to cost about $55,000 with equipment.

Spicer Mfg. Co., South Plainfield, N. J., manufacturer of universal joints, axles, and kindred products for automobiles, is said to be planning addition to plant at Toledo, Ohio, to cost more than $60,000 with equipment.

Board of Education, East Fourth Street and Rockwell Avenue, Cleveland, has rejected bids recently received for one and two-story addition to foundry at 525 Eagle Avenue, and has had plans revised. It will cost about $45,000 with equipment. Bids will be asked early in January.

George M. Hopkinson, Auditorium Garage Building, is school architect.

Hazel-Atlas Glass Co., Wheeling, W. Va., has plans for one-story addition to machine shop at Zanesville, Ohio, reported to cost over $50,000 with equipment. C. E. Handshy, 134 West Main Street, Zanesville, is architect.

Ferro Enameling Co., Keith Building, Cleveland, Ohio, manufacturer of enameled steel sheets, etc., has arranged for stock issue to total $1,737,500, part of proceeds to be used for expansion.

Toledo Edison Co., Toledo, Ohio, is arranging fund of $3,000,000 for extensions and improvements during 1929, of which more than one-half will be used for expansion at Acme power station, including new generating and other equipment.

Eastern interests engaged in manufacture of sanitary products allied to product of National Sanitary Co., Salem, Ohio, have purchased large holdings in that company and selling organizations of two companies will work in conjunction. Present capacity of National company will be required to take care of increased demand and provision will be made for extensions when necessary. Charles G. Burton continues as president and general manager of company.

Hill Clutch Machine & Foundry Co., Cleveland, has appointed following dealers: Lombard Iron Works, Augusta, Ga.; Murray Co., Dallas, Tex.; D. de Treville, Savannah, Ga.; J. G. Iler, Charlotte, N. C.; Cameron & Barkley, Charleston, S. C., and William G. Moorman, Buffalo.

South Atlantic

BALTIMORE, Dec. 24.—Richmond Car Works, Inc., Richmond, Va., subsidiary of Standard Steel Car Co., Frick Building, Pittsburgh, is said to have plans for extensions and improvements to cost more than $400,000 including equipment. Work is scheduled to begin in about 30 days.

Port Development Commission, Munsey Building, Baltimore, has plans for one-story warehouse and terminal building to cost about $500,000, including conveying, elevating and other loading and handling equipment. J. E. Greiner, Lexington Building, is consulting engineer.

Western Electric Co., 195 Broadway, New York, has completed plans for first unit of new plant at River View Park, Baltimore, to manufacture radio and telephone equipment, and will break ground early next year. Work will include several units and power plant, and will cost over $20,000,000. H. K. Ferguson Co., Cleveland, is engineer and contractor.

Eastern Silica & Chemical Co., Winchester, Va., operating at former plant of Winchester Glass Sand Co., is planning an expansion program, including new mill and pulverizing plant for silica production, to cost over $50,000 with machinery.

Frank W. Dryden & Sons, Lancaster and Dallas Streets, Baltimore, oils, are planning new storage and distributing plant to cost about $40,000, with equipment.

Bainbridge Power Co., Bainbridge, Ga., has authorized construction of one-story ice-manufacturing plant, to cost $55,000 with machinery.

A. A. Whitlock, Berwick, Pa., formerly head of Berwick Gas Co., has organized a company to construct and operate an artificial gas plant at Hickory, N. C., with machinery installation to cost about $100,000.

Bartlett Hayward Co., Scott and McHenry Streets, Baltimore, is planning one-story addition to plate shop, 53 x 315 ft., to cost about $50,000 with equipment.

James A. Lenfesty, Cambridge Arms, North Charles and Thirty-fourth Streets, Baltimore, has been appointed agent in Baltimore and Washington territory for Hunter Saw & Machine Co., Pittsburgh, manufacturer of metal cutting circular saw blades, sawing machines and kindred products.

Gulf States

BIRMINGHAM, Dec. 24.—Humble Pipe Line Co., subsidiary of Humble Oil & Refining Co., Houston, Tex., has plans for construction of pipe line from Luling to Ingleside, Tex., where parent company has begun work on new refinery. Line will cost about $1,000,000.

Chevrolet Motor Co., Pioneer Building, Birmingham, headquarters at Detroit, has taken bids on general contract for one and two-story parts and repair building, 118 x 210 ft., at North Twenty-sixth Street and Ninth Avenue, to cost more than $100,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Ovens, power equipment, conveying and other machinery will be installed in addition to baking plant of Texas Bread Co., 1118 Taylor Street, Houston, Tex., to cost about $130,000.

W. D. Kennedy, Dallas, Tex., operating Kennedy Machine & Brass Co., 2236 Live Oak Street, manufacturer of brass, bronze, aluminum and other metal castings, and other local industries, has acquired two-acre tract at 3110 Oak Lane Avenue, with one-story building, 100 x 300 ft., for group of factories, including El-Food Corporation and Real Arts Advertising Co., affiliated organizations. New unit will be erected at early date for Kennedy Machine company. Project will cost more than $200,000.

American Cast Iron Pipe Co., Birmingham, has awarded contract to Southern Steel Works Co., 908 Lucien Avenue, for one-story addition, to cost about $45,000 with equipment.

C. S. Hamilton Motor Co., Commerce and Pearl Streets, Dallas, Tex., local representative for Chrysler automobile, is planning two-story and basement service, repair and sales building, 120 x 140 ft., to cost about $120,000 with equipment.

American Potash Co., care of Chamber of Commerce, Odessa, Tex., is planning development of potash properties near city, with raw material equipment for capacity of about 2000 tons per day, refinery, machine shop, boiler plant and other structures, to cost more than $200,000.

Coronet Phosphate Mining Co., Coronet, Fla., is planning development of phosphate properties near Mulberry, Polk County. Mining equipment will be installed, mechanical washing plant, etc., to cost more than $65,000. Work will begin in about 30 days.

Detroit

DETROIT, Dec. 24.—Flint Ornamental Iron & Wire Works, Flint, Mich., is having plans drawn for one-story plant, to cost about $28,000 with equipment. G. Bachman, Pengelly Building, is architect.

Cranbrook School for Boys, Lone Pine Road, Bloomfield Hills, Mich., has plans for addition to arts and crafts school unit to cost about $50,000 with equipment. Cranbrook Architectural Service, Lone Pine Road, a division of school, is architect.

Consumers Power Co., Jackson, Mich., has plans for one-story equipment storage and distributing plant at Grand Rapids, Mich., with repair department, to cost about $50,000 with equipment.

Federal Screw Products Co., 3401 Martin Street, Detroit, has awarded general contract to E. D. Jackson, 5930 Commonwealth Avenue, for one-story addition for storage and distribution to cost about $25,000 with equipment.

Automotive Panel Board Co., Detroit, care of D. E. Hokin, 1475 Boston Boulevard, recently organized by Mr. Hokin and associates with capital of $350,000 to manufacture panel boards for automobiles and other service, has taken over a factory at Sandusky, Ohio, for new works, to cost about $75,000 with equipment. Samuel Rosen, Sandusky, will be an official of new company.

Morse Counterbore & Tool Co., 2007 Poplar Avenue, Detroit, is said to be planning installation of additional tools and equipment in machine shop.

Allied Products Corporation, Detroit, recently organized, has taken over and will consolidate Victor-Peninsular Co., 4646 Lawton Avenue; Richard Brothers Die Works, 1560 East Milwaukee Avenue, with branch plant at Hillsdale, Mich., and Indiana Lamp Corporation, Connersville, Ind. R. O. Cunningham is president of Allied Corporation. Expansion is planned.

Federal Mogul Corporation, 11031 Shoemaker Avenue, Detroit, manufacturer of metal bearings, has awarded general contract to Austin Co., for one-story addition, 125 x 175 ft., to cost about $70,000 with equipment.

Moyer White & Co., 2644 Lenox Avenue, Detroit, have been appointed agents in that territory for Hunter Saw & Machine Co., Pittsburgh, maker of metal cutting circular saw blades, sawing machines and kindred products.

Morris Machine Works, Baldwinsville, N. Y., maker of centrifugal pumps, has removed Detroit office to 730 Fisher Building.

Pacific Coast

SAN FRANSCICO, Dec. 19.—Willard Storage Battery Co., 246 East 131st Street, Cleveland, subsidiary of Electric Storage Battery Co., Philadelphia, is concluding purchase of property at Los Angeles for new plant for Pacific Coast trade, to cost about $500,000 with equipment.

Thaden Metal Aircraft Corporation, Alameda, Cal., H. V. Thaden, president, is considering construction of airplane manufacturing plant, including parts and assembling, to cost more than $150,000 with equipment.

W. Templeton Johnson, San Diego, Cal., architect, has plans for five-story automobile service, repair and garage building, 60 x 200 ft., to cost over $125,000 including equipment.

Washington Electric Co., Stuart Building, Seattle, plans hydroelectric power plant on Columbia River, in Chelan and Douglas Counties, to cost over $5,000,000 with transmission system.

Bergstrom Steel Co., 613 North Hewitt Street, Los Angeles, has awarded general contract to Union Iron Works for

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new one-story plant, 80 x 250 ft., to cost over $75,000, with equipment.

Kings County Packing Co., Reedley, Cal., has awarded general contract to Austin Co. of California, Inc., Los Angeles, for new plant on four-acre tract at East Oakland, Cal., with main unit two-stories, 180 x 300 ft., machine shop and boiler plant, to cost more than $250,000 with machinery.

Pacific Public Service Co., Russ Building, San Francisco, operating Coast Counties Gas & Electric Co., Merchants Ice & Cold Storage Co., Los Angeles, and other public utilities, has arranged for stock issue to total $1,140,000, part of proceeds to be used for expansion and betterments in plants and system. E. Foster Salsbury is president.

California Pear Growers' Association, San Francisco, Frank P. Sweet, manager, is interested in project to construct and operate a cold storage and refrigerating plant and terminal on waterfront, to cost more than $10,000,000 with equipment.

Canada

TORONTO, Dec. 24. — While machine tool sales have slowed up, due to the holiday season, demand is still fairly active and is decidedly better than a year ago. Inquiries for single tools for replacements are numerous and many indicate a good buying movement early in the new year. Several large lists are being prepared for new plants under construction in Toronto and throughout the Province on which bids will be asked before the end of next month. The railroads are buying for shop replacements and the automotive industry is inquiring for tools both for replacement and new works.

Robert Mitchell Co., 64 Belair Avenue, Montreal, manufacturer of gas and electric fixtures, metal goods, etc., has purchased a site in St. Laurent, Que., and is having plans prepared for a foundry.

Horton Steel Works, Ltd., Bridgeburg, Ont., has purchased adjacent property on Gilmore Street and it is reported that the new site will be used for erection of two new plants same size as present works, which will be remodelled and new equipment installed.

Town of Swansea, Ont., proposes to spend $125,000 on improvements to sewage disposal plant, including the purchase of new pumping machinery, etc. Wynne-Roberts, Son & McLean, Metropolitan Building, Toronto, are engineers.

Hospice Ste. Anne, Baie St. Paul, Que., is having plans prepared by Raoul Chenevert, 20½ d'Aiguillon Street, Quebec, for an electric light plant, to cost $50,000.

Rogers Batteryless Radio Co., 90 Chestnut Street, Toronto, is having plans prepared by Horwood & White, 229 Yonge Street, for a new plant, to cost $200,000. Building will be two stories and basement, 125 x 250 ft.

General Steel Wares, Ltd., 333 Wellington Street, London, Ont., has awarded contract to J. W. Putherbough, Bank of Montreal Chambers, for one-story addition, 150 x 250 ft., to its enameling plant, to cost $100,000. George Hunt is architect.

Hydro Electric Power Commission of Ontario, University Avenue, Toronto, is preparing plans for addition to power house and gate house at Queenston, Ont., to cost $4,000,000. Construction work will be started early in the New Year. F. A. Gaby, is chief engineer.

Collingwood Terminals, Ltd., Collingwood, Ont., has awarded contract to Carter-Halls-Aldinger Co., Ltd., Winnipeg, Man., at $575,000 for superstructure for grain elevator to cost $800,000. C. D. Howe & Co., Whalen Building, Port Arthur, Ont., are engineers.

Dominion Bridge Co., Ltd., head office Montreal, has purchased 13 acres at Calgary, Alta., and will start work soon on erection of a $200,000 structural steel fabricating plant. Company recently acquired control of Riverside Iron Works, Calgary, and contemplates erection of an addition to this plant next spring to cost $300,000.

Foreign

OFFICIALS of Fox Brothers' International Corporation, 33 Rector Street, New York, have organized Fox Brothers' International Corporation of France, with headquarters at Paris, to carry out operations in that country. Initial work now being placed under way consists of construction of five hydroelectric generating plants on Segura and Jugar Rivers, southern part of Spain, for service at lead mines and railroad operation, as well as for city of Valencia, to cost close to $20,000,000 with transmission system.

Metropolitan Water Board, 173 Rosebery Avenue, London, E. C. 1, is asking bids until Jan. 17 for three 200-hp. high compression heavy oil engines with reciprocating pumps for Woodford pumping station, Essex.

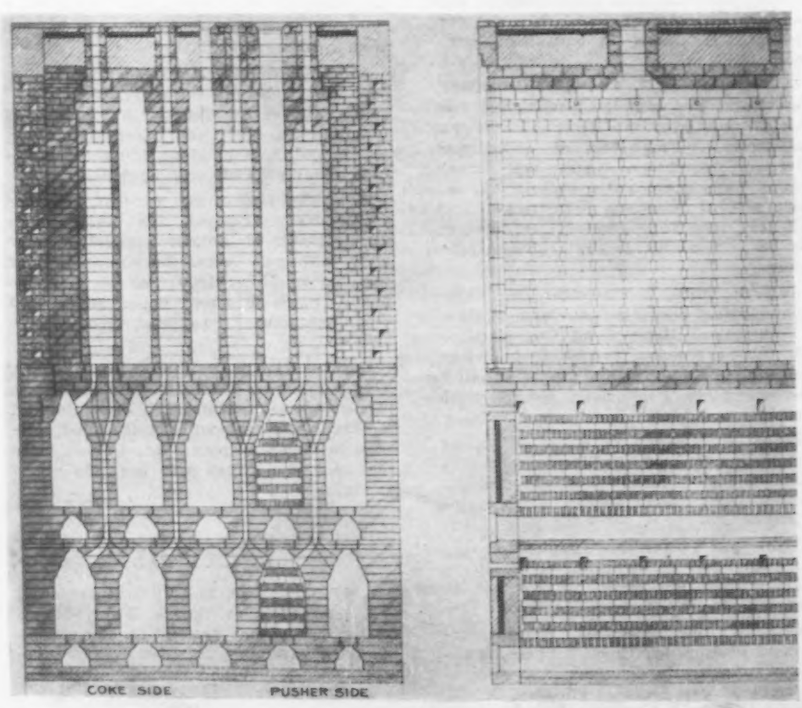
Brown-Boveri Electric Co., Berne, Switzerland, has entered into agreement with city of Bucharest, Rumania, for construction of two hydroelectric power plants near that municipality, 15,000-hp. and 10,000-hp. capacity, respectively, to be owned and operated by Brown-Boveri company for period of 19 years, when stations will revert to city. Project is reported to cost about $1,000,000 with transmission lines.

A railroad company at Dairen, Manchuria, has arranged budget of $2,000,000 for pier construction in 1929-30 at Kwanchingtze, on north side of bay opposite Dairen, including mechanical loading equipment and devices. It is stated that an excellent opportunity is offered for sale of American-made cargo-handling equipment. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference China No. 294456.

Coke Ovens Designed for Flexible Operation

TO increase the flexibility of its equipment and its adaptability to meet conditions, which may vary from day to day, the Foundation Oven Corporation, 120 Liberty Street, New York, has rearranged the regenerators in its balanced draft coke oven design. When heating with coke oven gas, only the air passes through the regenerators and a single chamber suffices. To permit the use of producer gas or even of blast furnace gas for heating the oven, when there is a demand for coke oven gas for open-hearth furnace or other uses, the regenerators under the new arrangement are split into two parts, one being placed above the other, as shown in the illustration.

With this arrangement, whereby both the air and the heating gas for the ovens are separately regenerated, it becomes possible to utilize all of the coke oven gas for sale either to other departments or outside the plant. The ovens still are built with the usual gas duct and nozzles for oven gas, but can be switched over very quickly from the use of one gas to the other as requirements demand. This adaptation does not change the essential features of the heating system, although it permits realizing greater flexibility.



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